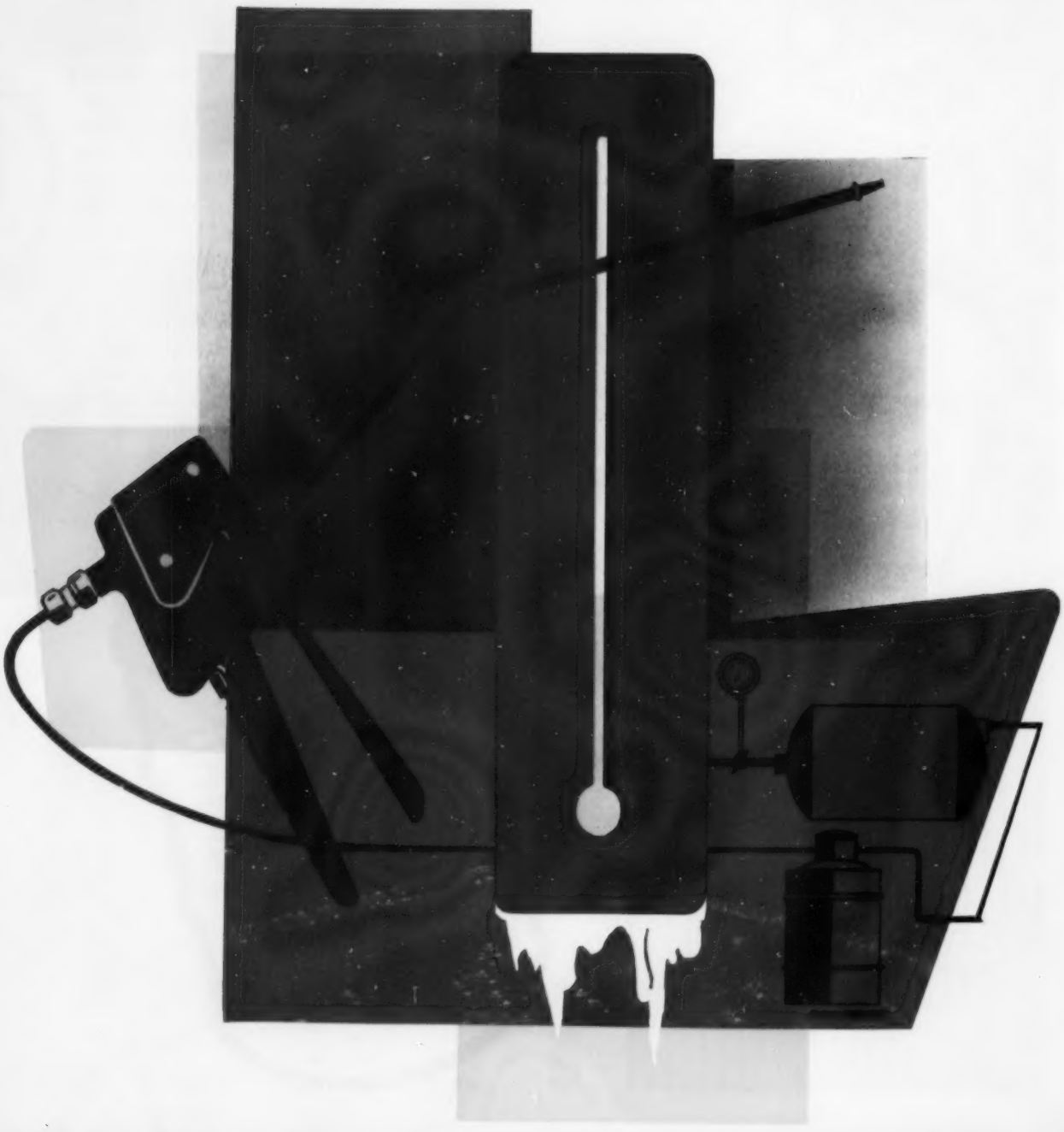
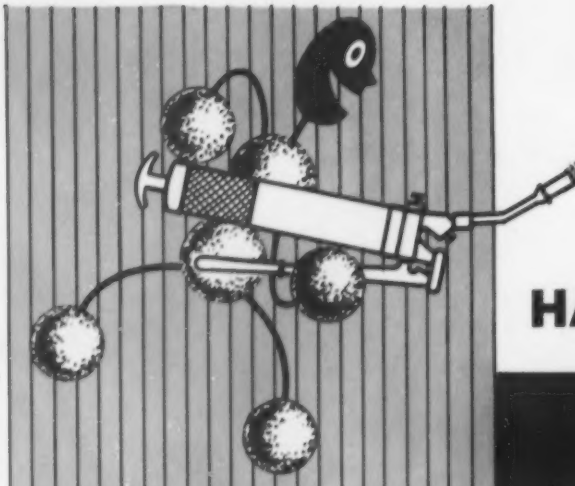
NLGI Spokesman

Journal of National Lubricating Grease Institute





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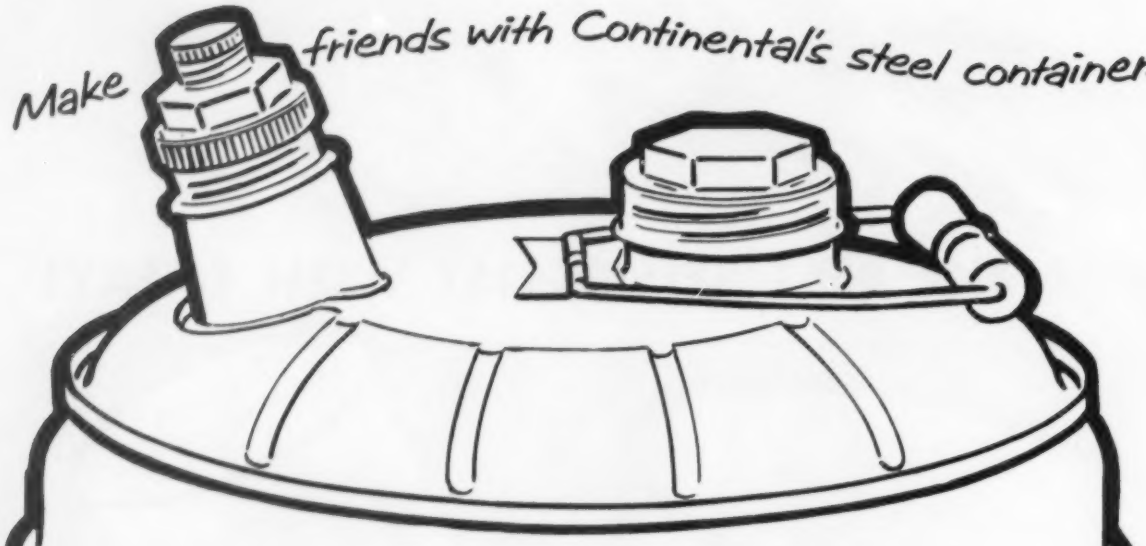

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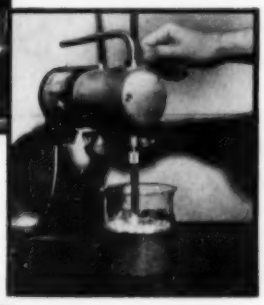

◀ MILLING—milling or homogenizing produces a smooth, consistently uniform grease.

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EVERY DAY Baroid's extensive laboratories assist grease compounders to formulate greases with Bentone* 34 gelling agents. Compounders throughout the country have used Baroid laboratory service to obtain the best formula — using *their* oil and Bentone* 34 — to make a grease that's right for thousands of applications. For the farm . . . automotive industry . . . industrial machinery of every kind — grease made with Bentone* 34 serves a need not met by any other type of lubrication. Its unique composition has a tenacious quality that causes it to adhere to metal . . . has a matchless resistance against rain and washout . . . works well under both *extreme* high and low temperatures! It answers a multitude of lubrication problems because one Bentone grease is good for scores more applications than any known conventional lubricant.

Bentone grease is always uniform, always the same high quality. Write today for illustrated brochure about Bentone* 34 gelling agent.

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THE NON-SOAP GELLING AGENT

NATIONAL LEAD COMPANY ★ BAROID DIVISION

P. O. BOX 1675, HOUSTON 1, TEXAS

President's page

by H. L. HEMMINGWAY, President, N L G I

1956 Begins in September

While most people begin to think in terms of the new year only after January first, with many automobile enthusiasts and those in the automobile industry, the new year begins with the introduction of new car models. At this writing it appears that the 1956 model year will begin in September.

New Models Spell Possible Lubrication Problems

Lubricating grease and oil people view each new model year with mixed feelings. There is pleasant anticipation of improvements in styling and performance, and unpleasant anticipation of the problems that new models sometimes bring to the oil industry.

It is now certain, for example, that the 1956 cars will bring further increases in horsepower. This will improve performance (possibly beyond the possibility of practical utilization in many areas), but may also intensify the technical problems of furnishing satisfactory engine oils and rear axle lubricants. Quite probably the 1956 variety of the Hydra-Matic transmission will differ substantially from earlier types, and this may affect its lubricant requirements.

A Reduced Market?

Specifically, some of the problems which new automotive developments have brought to the lubricating grease industry are discussed in the August issue of *National Petroleum News* under the heading "Chassis Lube Market Still Growing—But Tomorrow?" This story points out that because of the reduction in number of lubrication fittings, to lubricate all the 1956 cars for one year may require 40% less chassis lubricant than would be required to lubricate all the cars built in 1950. The same article also quotes chassis design experts as demanding better quality lubricants. So, the new model year may be bringing a reduced market more highly concentrated on the higher quality products from our industry.

Trend Toward Fewer Fittings

While the trend seems to be toward fewer lubrication fittings, they may be harder to find. Smaller wheels of 13 to 14 inch diameter (as compared with the present 15 inch size) plus the greater crowding of engine and accessories under the hood may reduce accessibility under the car and under the hood. The combination of smaller wheels and higher performance may lead to higher brake and hub temperatures which doesn't ease the job of the wheel bearing lubricant.

These are the possibilities that can be foreseen now. Undoubtedly there are other lubricant problems that no one can foresee. As the 1956 automobile year begins, the lubricating grease industry faces a new set of problems. From the progress that has been made, we believe our industry is better equipped than ever to meet this new challenge.

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by H. L. Hemmingway, The Pure Oil Company

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ABOUT THE COVER

"Publication of the NLGI TENTATIVE METHOD marks a red letter day for us," we told artist Ronald Jones. Then we handed him a stack of assorted pictures, drawings, diagrams, charts, graphs and other material illustrating the method. The aggregation measured about a foot thick.

Somehow he picked out illustrations that hit the heart of the whole thing, found a thermometer somewhere and proceeded to give us a graphic sketch of the method. Here is how it looks to an artist.

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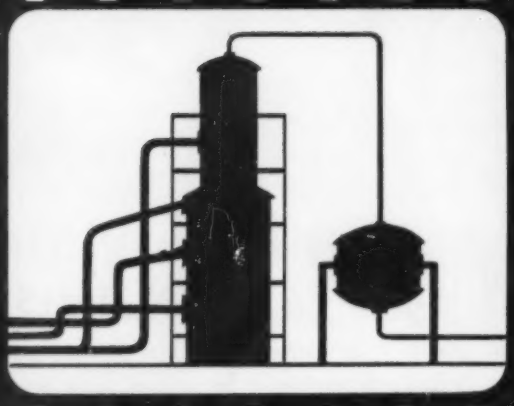
for the lubricating grease industry



Have you investigated the outstanding qualities of Cenwax A and Cenwax G in the compounding of lithium greases?

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Motorist Learns Value of Lube Safety Check

He Ignored Serviceman's Warning with Nerve and Car Shattering Results

A recent visitor to the NLGI office told us a fascinating and hair raising tale that proved the serviceman a hero of the highway in more ways than one. Our visitor was Donald G. Forbes, a representative for the McCormick-Armstrong Printing Company located in Wichita, Kansas. He also has an interesting sideline of owning and presenting a do-it-yourself television program that has proved quite popular.

We showed him a news release then being sent all daily and weekly newspapers. Its theme was the value of the safety check that goes with all lube jobs. He read it through with keen interest. "I've got a story to tell you right along this line," he commented thoughtfully.

"They'll Hold for One More Trip"

Here is his story just as he told it to us:

"I'll tell you I'll believe my serviceman after this.

"A while back in Wichita, Kansas, I went into a service station for a lube job and oil change. When I returned to the station to pick up my car the serviceman still had it on the rack because he had something to show me. He wanted to point out how the tie rods were worn and warned me they were in a dangerous condition.

"Well, I was in a hurry to get out to an oil well near Kingman, Kansas, so I said, 'surely they'll hold for just one more trip' and took off. I forgot all about them and zipped along the smooth Kansas highway at seventy or better. I not only forgot about the serviceman's warning – but I was lucky. Everything went well – well, that is, until I turned on a dirt side road and was jogging along about thirty miles an hour.

Tie Rods Didn't Hold

"Then it happened. Suddenly I felt a strong tug to the right and toward an embankment. Automatically I turned my wheels to the left and put on the brake. The wheels failed to respond and I finally came to a bone jolting stop half way up an embankment. Fortunately it went up instead of down.

"Still not knowing what happened I got out and looked at the car. The front wheels were spread eagled. Each turned awkwardly in opposite directions, I'd plowed up about 100 feet of country road just as surely as if I had a plow on the front of the car. Later I learned the frame was badly sprung and with other assorted damage the car a complete wreck.

"I Wouldn't Be Here"

"I was pretty well shaken by the experience, not only because of the sudden stop, but because of the thought that if the tie rods had broken a few minutes sooner—I wouldn't be here to tell you this experience.

"Now I not only believe the serviceman when he tells me something is unsafe, but I check with him personally and ask him about the various points of safety about the car he can see when lubricating it. You bet, I was lucky once, but I'm going to try to be safe rather than sorry from now on."

"I'd plowed up about 100 feet of country road," says Mr. Forbes demonstrating with hands how his front wheels turned when tie rods let go.

"Each turned awkwardly in opposite directions"

Three Lube Safety Factors

We give you this true story because it points up three important safety factors every driver should remember:

The only regular time your car receives a safety check is when you get a lube job.

When the serviceman warns you of an unsafe condition—take care of it then. Don't risk the life of your family and your own with an unsafe car.

You can't receive this safety check unless you take it to your serviceman—Take it to him at least every 1,000 miles. You'll have a safer and more comfortable car. It will last longer and so will you.

If you're interested in the marketing aspects of lubricating grease,

Continued on page 47

Introduction to

NLGI Tentative Method

By N. MARUSOV

Chairman NLGI Subcommittee on Delivery Characteristics of Dispensing Equipment for Lubricating Greases

The need for an NLGI Dispensing Method has been obvious for some time. The state of affairs with regard to dispensing of lubricating greases might best be shown by listing typical questions that confronted equipment manufacturers, grease producers, station managers, and even customers. Too often the following typical questions were repeated:

The Service Station Managers inquired, "Will the dispensing pump that I have handle your lubricating grease?"

The Grease Supplier asked, "How heavy a grease will your pump handle?"

The Equipment Manufacturer needed to know, "How heavy is your grease?"

The Customer wondered, "What good is a lubricating grease, no matter how wonderful, if you can't get it into the bearings?"

It was difficult to answer these questions with any degree of certainty because there was a need for some means of expressing the pumpability of greases in absolute units, which definitely defined the flow behavior of greases. There was also a need for pumpability information with regard to dispensing equipment. The whole problem became extremely complicated because equipment manufacturers and grease producers did not have a common language. They did not always mean the same things when they used the same terms. The only way that these questions could be answered was on a basis of rule-of-thumb, resulting from experience with known greases and familiar dispensing pumps. More certain answers were given only after full-scale tests were made with a specific pump and specific lubricating grease. These tests were always expensive, and check tests by others were impossible because uniform procedures were not established. Since there were many different models and makes of dispensing equipment, and many different compositions of lubricating greases, full-scale tests with all possible combinations were prohibitive.

The problem was further complicated by the fact that there was no satisfactory means of communication between equipment manufacturers and grease producers.

At the 1946 NLGI Technical Committee meeting, two questions were asked which clearly drew the lines of the problems involved. A grease producer stated, "We have just developed a new lubricating grease that has excellent properties from the standpoint of lubrication, mechanical stability, chemical stability, dropping point, color, etc. Is there an equipment manufacturer here who can tell me whether or not his standard model dispensing pump can handle this grease?" The equipment manufacturer, of course, wanted to know, "How heavy is your grease? for example, what pressures would it take to force your lubricant into the tightest automobile bearing?"

The outcome of the ensuing discussion was the formation of the NLGI Subcommittee on Delivery Characteristics of Dispensing Equipment, and the development of a "Method for Matching Lubricating Grease Flow Properties with Lubricating Grease Dispensing Pump Delivery Behavior at Low Temperatures." The method, as developed, requires no particular type of pump design. It simply establishes the delivery characteristics of dispensing equipment at high grease viscosities.

Nearly every manufacturer of dispensing equipment has a method for rating pumps. Moreover, methods have been developed by companies in the grease industry. However, the various methods differ from each other.

For this reason, the results obtained cannot be compared. The tentative NLGI Dispensing Method, among other things, standardizes the test procedure. It is hoped that it will be tried widely. If there are features of other test methods that would improve the NLGI Method, it may be desirable, in time, to modify it accordingly.

As to further activities of the committee, it is planned to carry out additional experimental work on the development of a bench test for evaluating slumpability of a grease. Although bench test results to date have shown reasonable good correlation with each other, when compared with full-scale equipment tests, the correlation is not good.

Consideration is also being given by the committee to the use of a standard lubricant for evaluating dispensing pumps. It is, of course, difficult to specify a given lubricating grease for this purpose, because of structural changes that can occur in storage. It may be possible to develop a technique whereby a high viscosity oil may be used as a standard. This latter approach is under investigation at the present time.

Preparations are in progress for checking whether the NLGI Method will be applicable to permanent-type installations; i.e., those installations that use 400-lb. drums and require many feet of tubing and reel. No data are as yet available for this type of assembly.

The following lists all members and their company affiliations who have served on this Committee either as members or alternates:

T. G. Roehner, Socony-Mobil Oil Company, Inc., Chairman, Technical Committee
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N. Marusov, Gulf Research & Development Company, Present Chairman
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G. A. Williams, Battenfeld Grease & Oil Corporation
F. E. Woodward, Chemical Laboratory, Rock Island Arsenal

Definition of Terms

In the discussion that follows, a number of terms are used which should be defined. Those terms are given below.

1. *Apparent Viscosity*

One way to define viscosity is to say that it is the physical property of a fluid that causes resistance to flow. For any material, the ratio of a force factor, called shear stress, to a flow rate factor gives the mathematical definition for viscosity. In lubricating oils, this ratio remains constant, irrespective of the rate at which the liquid is flowing. For lubricating greases, this ratio is not constant with flow rate, but decreases as the flow rate increases. For example, if a restrictor required 1000 p.s.i. pressure to give a flow rate of 20 oz./min. with an oil (Newtonian), then at 2000 p.s.i. the flow rate would be 40 oz./min., at 3000 p.s.i. it would be 60 oz. min., etc. The ratio of pressure to flow is constant. For non-Newtonian materials, such as lubricating greases, the flow might be 20 oz./min. at 1000 p.s.i., but at 2000 p.s.i., the flow might be as much as 50 oz./min. and at 3000 p.s.i. it could be 80 oz./min. The ratio of pressure to flow is not constant.

2. *Rate of Shear*

Rate of Shear is a factor which defines the flow rate inside various conduits of specific dimensions. A mathematical definition of rate of shear may be developed by considering one flat plate sliding over another with both plates separated by a layer of viscous material. The rate of shear is then the velocity of the moving plate (V) divided by the thickness of the viscous layer (h), therefore:

$$\text{Rate of Shear} = \frac{\text{Velocity}}{\text{Thickness}}$$

$$\text{Rate of Shear} = \frac{V}{h}$$

$$\text{Rate of Shear} = \frac{\text{cm./sec.}}{\text{cm.}}$$

$$\text{Rate of Shear} = \frac{1}{\text{sec.}}$$

The dimensions of this quantity are often written as sec.^{-1}, and are called reciprocal seconds. Since the apparent viscosity of a grease changes with rate of grease flow, we must specify not only temperature, but also the rate of shear, since both affect the viscosity.

3. *Pumpability*

Pumpability is a term that defines ease of grease flow in and beyond the pump mechanism of the dispensing unit. The pumpability of a grease increases as its apparent viscosity decreases.

4. *Slumpability*

Slumpability, as used in this report, designates the characteristic of the grease that permits pump priming. As a mechanical definition, it might be considered as either a yield value, which is the shear stress required to produce initial movement, or may even be the force to maintain flow at extremely low rates of shear.

Summary

The NLGI has developed a method whereby it is possible to predict whether or not a certain lubricating grease can be dispensed in a specific dispensing pump at some specified low temperature. This method also determines the lowest temperature at which a borderline of satisfactory delivery will be attained for a given grease-pump combination.

The method rates grease pumps in terms of grease properties. Originally, there were ten variables. They are numbered and grouped in Plate I according to the agencies which control them. The standardized variables are shown in this figure. The three to be tested are also indicated.

In practice, the grease company runs apparent viscosity tests, plots Curve I (Plate I), and presents the data to pump companies and customers. The pump company runs dispensing tests, plots Curve II, and marks the limiting viscosity on each pump. The customer (or grease company) may plot Curve III to obtain the limiting temperature of a gun-grease combination.

Discussion of the NLGI Tentative Dispensing Method

The scope of the Method involves three phases of procedure for selecting lubricating greases to be used with specific pumps at low ambient temperatures. As indicated in the terminology, the NLGI Tentative Dispensing Method is limited to air-operated lubricating grease dispensing pumps, as used for automobiles, trucks,

BASIS OF NLGI TENTATIVE DISPENSING METHOD

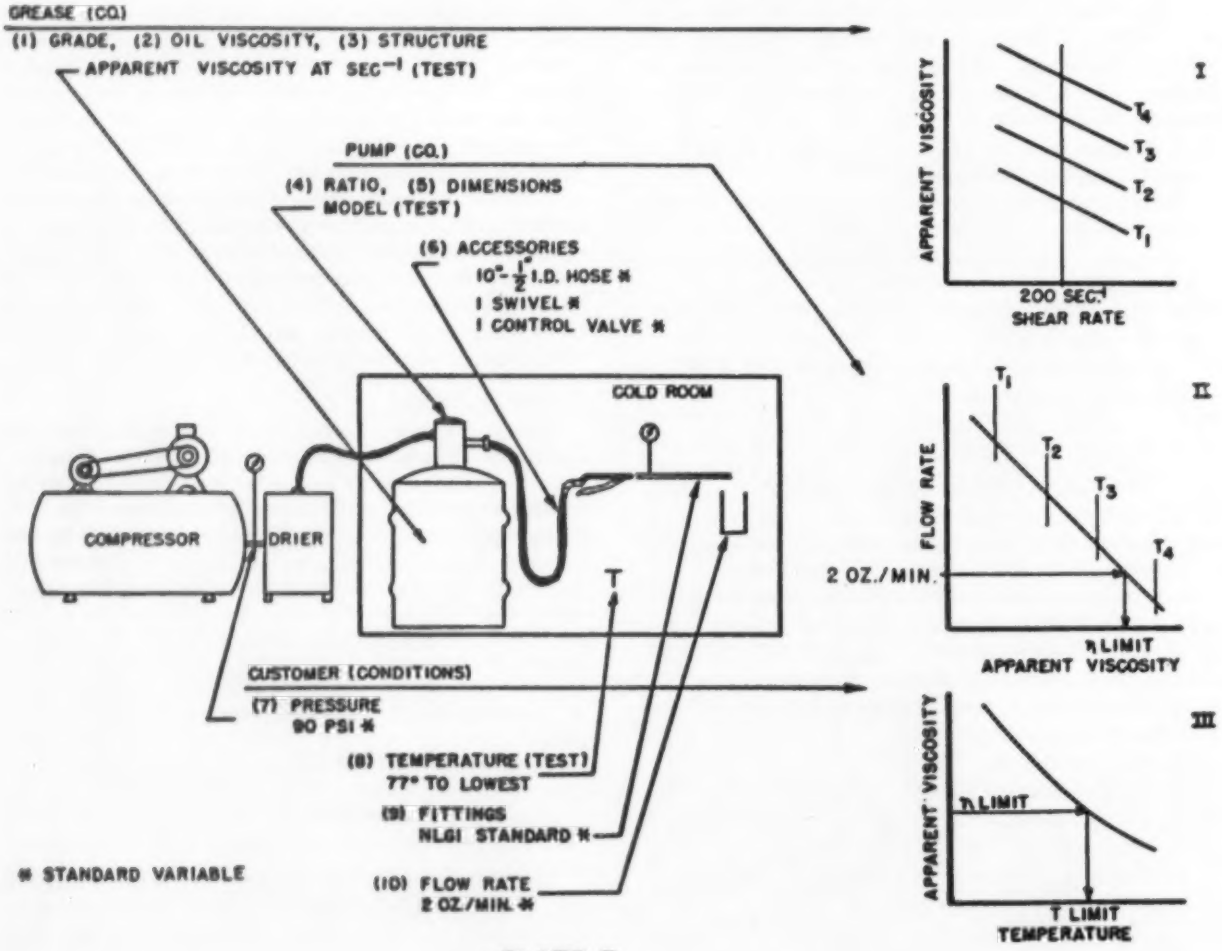


PLATE I

buses, etc., and to greases that have been developed for automotive chassis lubricant use.

Reasonable reproducibility can be obtained using this method at temperatures as low as 32° F., and there is good reason to suspect that the Method will be applicable even at lower temperatures.

To establish the delivery characteristics of dispensing pumps, it is essential that the lubricating grease sample be used only once. This is because of the changes in flow properties that may occur in greases with mechanical working.

Three temperatures; namely, one within 70-80° F., another within 40-50° F., and a third which will give a grease delivery of less than 2 oz./min., have been arbitrarily selected for rating a gun. It is not at all important that tests be made at any specific temperature, because the results will be plotted on a curve and any three adequately-spaced points will be useful. It is, however, important that the values of the temperatures be known, because the viscosity of a grease changes with temperatures. At low temperatures, the rate of change may be extremely high; for example, as much as 200 poises per Fahrenheit degree for some greases. It is recommended that these temperatures be measured within plus or minus ½° F. This precision of temperature measurement is not too difficult to obtain.

A cold room, or a refrigerated box, capable of holding the test temperature within a minimum deviation of plus or minus 2° F., for a period of four days, is required. This box should be large enough to contain the equipment under test and to permit measurements with all parts of the equipment subjected to these temperatures. Three days, or 72 hours, are required for a 100-pound drum of grease to attain equilibrium temperatures throughout the entire sample.

An air drier and surge tank of optional design are also required. The pressure regulator should be capable of maintaining the desired pressures within plus or minus 2 p.s.i. This auxiliary equipment is required for uniformity of test and to insure dry air (prevent freezing) and to eliminate pulsations.

The Restrictor, shown in Figure II of the Method, is required to simulate back pressures produced by tight automobile fittings. Tests made without a restrictor do not simulate field conditions, and the deviation is so great that results obtained would be misleading.

The apparatus should be assembled as shown in Figure I of the Method. A thermocouple mounted on a suction stub, one inch from the pump inlet, is used for test temperature measurements. This thermocouple should be firmly mounted in order to prevent its passage into the inlet port. Since this location is near the center of a drum of grease, this will be the place of least temperature variation. The location also has the advantage that it is measuring the grease temperature just prior to its entrance into the pumping mechanism.

The testing procedure consists of first attaching the NLGI Restrictor and allowing the entire assembly and lubricating grease to come to test temperature and soak for a period of 72 hours. Room temperature is suitable for the high temperature test. Prior to starting the test, it is recommended that the equipment be operated for 30 seconds without saving the grease dispensed. This operation will result in closer agreement between different test operators. Immediately thereafter, the gun should be operated for 50 cycles, elapsed time recorded, the amount of delivered product weighed, and the temperature, as indicated by the thermocouple, recorded. After 5 minutes, the operation should be repeated in its entirety. After another 5 minutes, the operation should be repeated again. The entire procedure should be repeated at at least two different lower temperatures.

The apparent viscosity at each test temperature may be obtained from a temperature viscosity chart, either supplied by a grease producer or obtained by means of the procedure for measuring the flow behavior of lubricating greases discussed later. If the delivery per cycle decreases at low temperatures by 25 per cent or more, it should be inferred that cavitation is too severe for an accurate evaluation of the dispensing equipment. In these tests, cavitation is considered as the decrease in delivery per stroke at room temperature between 70° and 80° F.

The use of follower plates would affect the pumpability of greases only indirectly in that better priming (slumpability) would occur. That means that there would be less tendency for cavitation and air binding. The net result would be improved delivery.

If temperatures or deliveries vary slightly between operations, it is suggested that each pair of data be plotted as a separate test point and the best line drawn between the plotted values.

To establish the limiting viscosity of dispensing pumps, the delivery in ounces per minute is plotted on log-log coordinates as a function of apparent viscosity. The intersection of this line with the 2 oz./min. line will indicate the limiting viscosity of the pump.

For establishing the flow behavior of the lubricating grease, an ASTM Viscometer is used. The testing procedures are modifications of ASTM Method D 1092-51, adopted in 1952. These modifications were required because the ASTM standard describes the procedure for test at one temperature only, whereas the NLGI Method requires results of at least three different temperatures. Furthermore, the ASTM Method measures apparent viscosity over a wide range of shear rates, whereas the NLGI Method requires these measurements at a specific shear rate of 200 reciprocal seconds.

Standards were not established for the cooling system to be used with the viscometer. Therefore, the cooling cabinet may be of optional design, but should be capable of maintaining temperatures of the grease within plus or minus 1° F. for 8 hours. Moreover, it should be large enough to accommodate the grease cylinder during measurement. A step-by-step procedure for viscosity measurement is included in the ASTM Method and need not be repeated here.

The results are illustrated in Figure VI of the Method. This is a curve showing the apparent viscosity at 200 reciprocal seconds as a function of temperature. The curve is necessary to establish the limiting temperatures for borderline delivery of specific pumps. For example, with a 400-poise pump and 90 p.s.i. air pressure, the limiting temperature of satisfactory operation will be 58° F.

NLGI Tentative Method . . .

for Matching Lubricating Grease Flow Properties with Lubricating Grease Dispensing Pump Delivery Behavior at Low Temperatures

Scope

This method finds the limiting viscosity for practical pump delivery, defines the procedure for measuring the apparent viscosity of lubricating greases, and combines these results to predict the lowest temperature for satisfactory performance.

Phase I—Test method for finding the most viscous lubricating grease (in terms of apparent viscosity determined as 200 sec^{-1}) that a dispensing pump will deliver through a standard NLGI restrictor at a rate of two ounces per minute.

Phase II—Test method for determining the apparent viscosity of lubricating greases at an apparent rate of shear of 200 sec^{-1}.

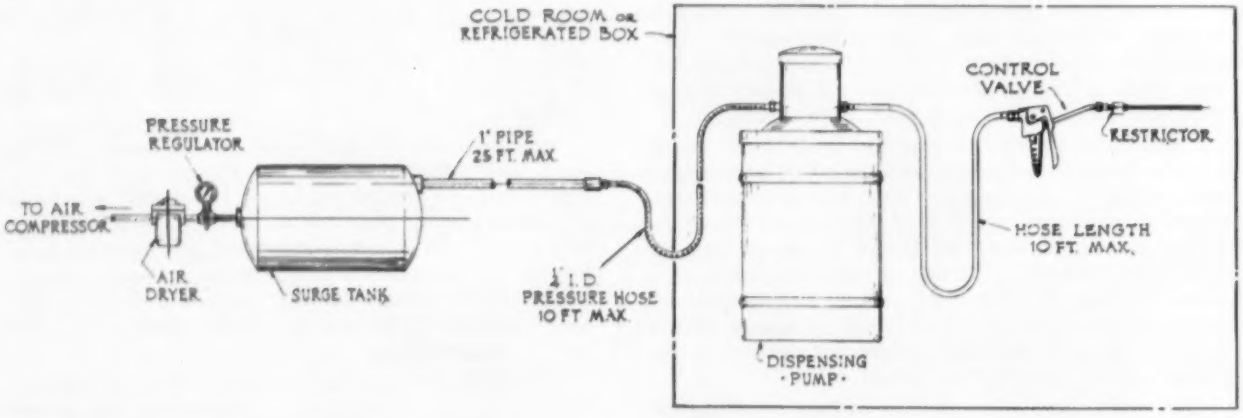
Phase III—Procedure for combining results obtained in Phases I and II to determine the lowest temperature at which a lubricating grease can be satisfactorily delivered in the dispensing pump.

Terminology

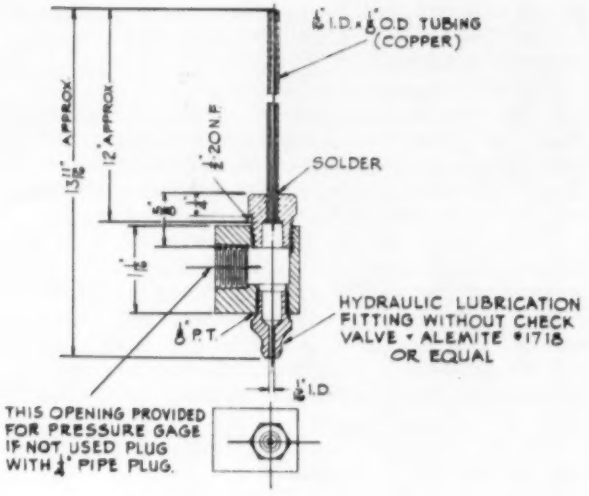
1. Apparent Viscosity: The apparent viscosity of a lubricating grease is the ratio of the shear stress to the apparent rate of shear as calculated from Poiseuille's equation.

2. Apparent Rate of Shear: Determined as $\frac{4Q}{\pi R^3}$ Where:

Q = Volume rate of flow and R is the radius of the capillary.



· TEST ASSEMBLY ·
FOR DETERMINING THE DELIVERY CHARACTERISTICS OF PUMPS
FIG. 1


1/8" I.D. x 1/4" O.D. TUBING (COPPER)
SOLDER
HYDRAULIC LUBRICATION FITTING WITHOUT CHECK VALVE - ALEMITE #1718 OR EQUAL
1/8" P.T.
1/8" I.D.
THIS OPENING PROVIDED FOR PRESSURE GAGE IF NOT USED PLUG WITH 1/4" PIPE PLUG.

RESTRICTOR FOR NLGI GREASE FLOW TEST
FIG. 2

(Note: Because Poiseuille's equation does not strictly apply to non-Newtonian materials, rate of shear and viscosity measurements of lubricating greases are merely apparent values.)

3. Shear Stress: Shearing force (pressure x circular area) divided by the shear area (circumference x length) which, for circular conduits, reduces to $\frac{PR}{2L}$ Where: P = applied pressure, R = radius, L = length.

4. Dispensing Pumps: Air-operated lubricating grease dispensing pumps as used for automobiles, trucks, buses, etc.–hose lengths not to exceed ten feet.

5. Lubricationg Greases: Automotive chassis lubricants.

6. Capillary: A right cylindrical tube having a length to diameter ratio of 40:1.

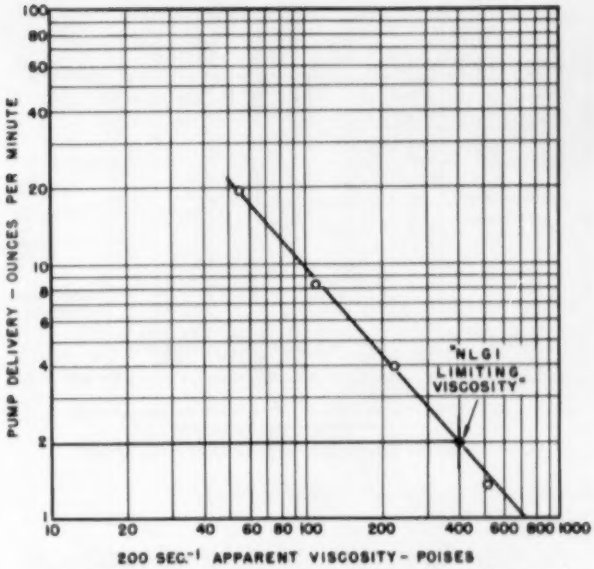


Figure 3—Phase I. Estimation of "NLGI Limiting Viscosity."

7. Cavitation: Reduction of delivery per stroke (compared with delivery per stroke obtained at temperatures between 70° F. and 80° F.).

8. Soaking: Maintaining the entire assembly at constant temperature.

Phase I—Delivery Characteristics of Dispensing Pumps

Outline of Method

All tests are made with unworked and unused lubricating grease. The delivery rates of the dispensing pumps are established at a minimum of three temperatures, one temperature between 70° F. and 80°F., one between 40° F. and 50° F., and one at which the delivery will be less than two ounces per minute.

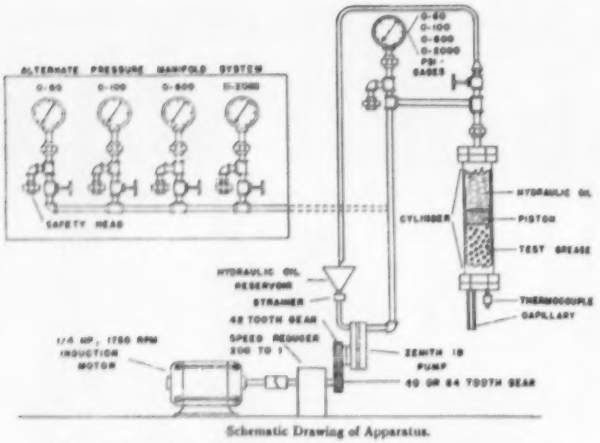
Delivery rate is plotted as a function of apparent viscosity on log-log coordinates. The intersection of the curve and the two ounce per minute ordinate indicates

TABLE I—SAMPLE DATA SHEET

To Determine Dispensing Characteristics of Lubricating Grease Dispensing Pumps

Restricted Flow—90 p.s.i. Air Pressure

Temp. °F.	*Cycles Per Test*	*Total Test Time Minutes*	*Wt. of Grease Dispensed Ounces*	*Delivery per Cycle Ounces*	*Delivery oz./min.*	*Average Delivery oz./min.*	*Apparent Viscosity Poises*
79	50	1.53	29.8	.596	19.5		
79	50	1.52	30.1	.602	19.8		
79	50	1.52	29.8	.596	19.5	19.6	57.5
60	40	2.75	23.3	.583	8.47		
60	40	2.78	23.5	.587	8.46		
60	40	2.82	23.5	.587	8.32	8.42	109
45	25	3.94	14.8	.593	3.75		
45	25	3.74	14.8	.593	3.96		
45	25	3.58	14.8	.593	4.13	3.95	222
32	10	4.76	6.00	.600	1.26		
32	10	4.33	5.80	.580	1.34		
32	10	4.10	5.90	.590	1.44	1.35	508



Schematic Drawing of Apparatus.

Figure 4—ASTM Viscometer and auxiliary equipment.

the NLGI limiting value of the pump.

Apparatus

The following equipment is to be assembled in the order shown in Figure 1:

1. Compressed air source capable of supplying a pressure of at least 90 psi. and means for maintaining test pressures within ± 2 psi.

2. Air dryer of optional design; may be a separate unit or included in the surge tank.

3. Surge tank having a minimum capacity of 30 gallons equipped with a pressure gage and connected to the equipment in the cold room by not more than 25 feet of one-inch pipe and ten feet of ¼ inch I.D. pressure hose.

4. A cold room or refrigerated box capable of holding the test temperature within a maximum deviation of ± 2F° for a period of four days, and large enough to contain the pump, hose, control valve, and restrictor.

(Note: All necessary operations are made without exposing any portion of the equipment under test to any temperature except test temperature.)

5. Dispensing pump to be tested.

(Note: Limiting dispensing value applies to pump as tested. Changes in hose length, number of swivels, design of control valve, etc., alter the delivery rate. For standardization, the lubrication of the air motor during test must comply with the manufacturers' recommendations included in sales and service manuals.)

6. Restrictor as shown in Figure 2.

Sample

One or more samples of grease in original packages suited to the equipment to be tested.

(Note: If follower plates are included in the packages they should be removed.)

Procedure

Assemble the apparatus and mount a thermocouple one inch from the side and flush with the bottom of the pump inlet. (Note: The end of the thermocouple should be firmly mounted to prevent its passing into the pump inlet port). The temperature at this point is used in all subsequent instructions.

1. Attach the NLGI restrictor and allow the assembled equipment and lubricating grease to come to test temperature and then "soak" at the test temperature 72 hours before making a test. Start at some convenient temperature between 70° F. and 80° F.

2. Adjust air pressure for 90 psi.

3. Operate the equipment for 30 seconds but do not retain the grease that is delivered. Immediately thereafter, operate the gun for 50 cycles and collect the grease. Record the elapsed time, weight of product delivered, and the temperature indicated by the thermocouple.

(Note: Should the gun run too fast at 70° F. to permit an accurate count of the number of cycles, the high temperature test may be made at a lower temperature).

4. Wait five minutes and repeat operation (3) in its entirety. Wait another five minutes and repeat it again.

5. Repeat items 2, 3, and 4 at a minimum of two lower temperatures with a minimum "soaking" period of 72 hours at each temperature.

The following temperatures and number of cycles at each temperature are suggested:

(80° F.–70° F.)–50 cycles
(50° F.–40° F.)–25 cycles
(32° F. or any temperature required for less than 2 ounces per minute delivery) –10 cycles

(Note 1: It is not important that test be made at specific temperatures, however, the temperature used should be known with a precision of ± 0.5F°).

(Note 2: To estimate temperatures required to give deliveries less than two ounces per minute, plot on log-log coordinates the results obtained at the two higher temperatures. Extrapolation of the diagram will approximate the value of the low temperature).

(Note 3: If it is impossible to complete tests at low temperature because of cavitation, the entire test should be re-made with a smoother texture grease).

To establish the limiting viscosity of pumps for other pressures in addition to 90 psi., adjust pressure to desired value and repeat items 3, 4, and 5 in their entirety.

Report limiting values as per the following example:

PUMP IDENTIFICATION

Air Pressure (psi.)	*Limiting Viscosity*
90	400
125	540
150	820

Calculations

Calculate and list the following as shown in Table 1:

a. Delivery per cycle = $\frac{\text{delivery weight per test}}{\text{number of cycles per test}}$

b. Delivery per minute = $\frac{\text{delivery weight per test}}{\text{test time in minutes}}$

c. Apparent viscosity at shear rates of 200 sec^{-1} at each test temperature–Obtained from temperature-viscosity chart or as indicated in Phase II.

d. Plot on log-log coordinates (Figure 3)–Delivery in ounces per minute as a function of apparent viscosity.

(Note: Where cavitation greater than 25 per cent is obtained, the test points should not be used for this standardization. Under conditions of cavitation, erratic deliveries may be observed.)

The intersection of the curve and the two ounces per minute line indicates the NLGI limiting apparent viscosity of the dispensing pump for that pressure.

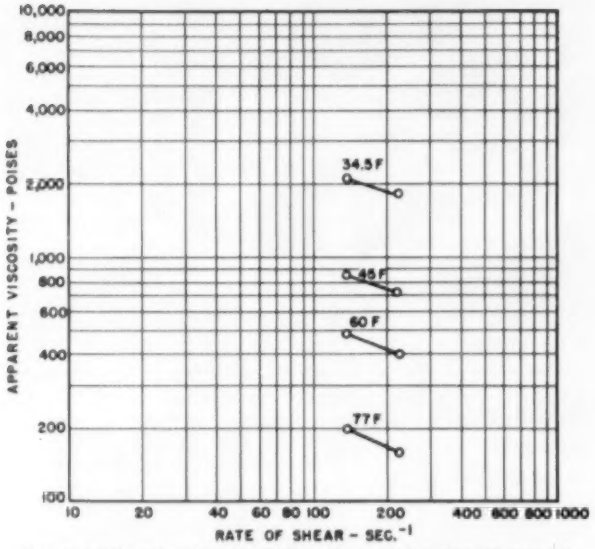


Figure 5—Phase II. Apparent Viscosity as a function of rate of shear temperature-various NLGI METHOD.

Phase II—Determination of Flow Properties of Lubricating Greases

Outline of Method

The apparent viscosity is determined in a pressure viscometer, in which a sample of the grease is forced through a capillary by means of a floating piston actuated by a hydraulic system. From the predetermined flow rate and the force developed in the system, the apparent viscosity is calculated by means of Poiseuille's equation. Only one capillary and two gear ratios are needed. The capillary is of such radius that with one of the gears supplied with the apparatus, the apparent shear rate will be nearly 200 sec^{-1}.

(Note: For detailed description of the instrument and its calibration, refer to ASTM Standard Method of Test for Apparent Viscosity of Lubricating Greases, ASTM Designation: D 1092-51, Adopted–1951).

Apparatus

1. ASTM Viscometer and auxiliary equipment. (See Figure 4). (Reference–ASTM Method 1092-51)
2. A cooling compartment of optional design capable of maintaining temperatures with ± 1F° for four hours and large enough to contain the grease cylinder during measurement.

Procedure

1. Charge the grease cylinder, excluding air.
2. Fill the entire hydraulic system completely with hydraulic oil. To insure complete filling, with the entire viscometer assembled, circulate the hydraulic oil with the return valve open until any trace of air is eliminated.

(Note: The hydraulic oil should have a viscosity of 2000 centistokes at the Zenith Pump temperature.)

3. With the entire hydraulic system connected and completely filled with hydraulic oil and test grease, adjust the temperature to the desired value and maintain for a period of four hours.
4. Use a capillary that will give approximately the desired value of 200 sec^{-1} apparent rate of shear. Operate the pump with the return valve closed until equilibrium

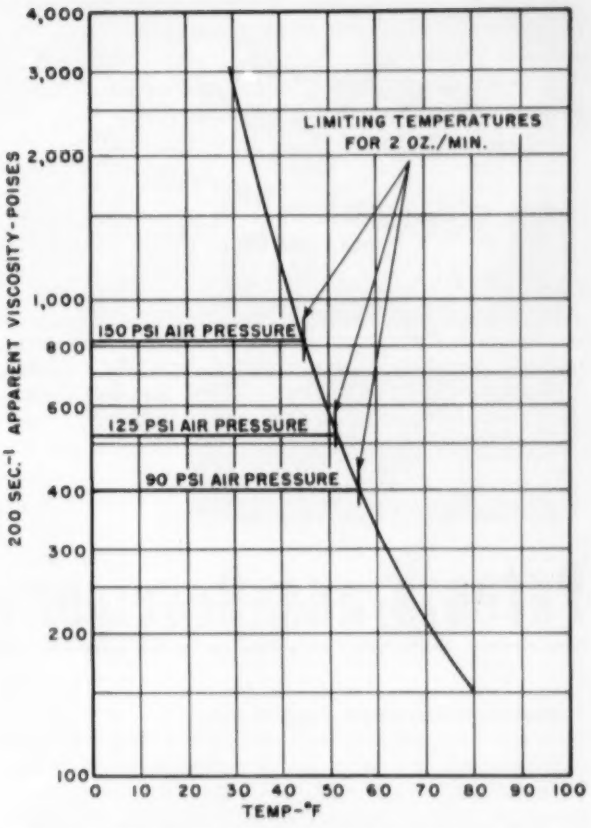


Figure 6—Phase III. Estimating the limiting temperature for 2 oz. min. for a given pump-grease combination.

pressure is obtained. Record the pressure. Change gears and establish the second equilibrium pressures. Record the second pressure.

Calculations

a. Calculate the apparent viscosity in poises of the grease as follows:

η = apparent viscosity = F/S

Where: F is the shear stress and S is the apparent shear rate, therefore:

$$\eta = \frac{F}{S} = \frac{P\pi R^2}{\frac{2\pi RL}{\frac{4Q}{\pi R^3}}} = \frac{P\pi R^4}{8LQ} = \frac{P69{,}000\pi R^4}{8LQ}$$

Where: P = Observed pressure, psi.

69,000 = Numerical conversion from pounds per square inch to dynes per square centimeter

R = Radius of the capillary–cm

$$Q = \frac{V}{t} = \frac{\text{Volume}}{\text{Time}} = \text{flow rate} = \frac{\text{milliliters}}{\text{seconds}}$$

b. Calculations may be reduced by preparing a table of constants for each of the two capillary and gear combinations. The calculations then involve:

$$\eta = \frac{P \text{ (Observed) } 69{,}000\pi R^4 \text{ or } PK}{8LQ}$$

Where: $K = \frac{69{,}000\pi R^4}{8LQ}$

c. Plot apparent viscosity vs. apparent shear rate (See Figure 5) and interpolate or extrapolate the apparent viscosity at 200 sec^{-1}.

d. Plot apparent viscosity at 200 sec^{-1} apparent rate of shear as a function of temperature (See Figure 6).

(Note: Semi-log coordinates are recommended.)

Phase III—Application of Results Obtained During Phase I and Phase II

Outline of Method

With diagrams showing the 200 sec^{-1} apparent viscosity as a function of temperature of various lubricating greases, establish the point of intersection of the NLGI Limiting Viscosity of the pump and the apparent viscosity-temperature curve. The intersection of the viscosity-temperature curve with the NLGI Limiting Viscosity indicates the limiting temperature for a given pump-grease combination.

Procedure

1. From the plot of apparent viscosity vs. apparent shear rate (See Figure 5) find the apparent viscosity of each grease at 200 sec^{-1}, at the several test temperatures, and plot apparent viscosity at 200 sec^{-1} as a function of temperature (See Figure 6).

(Note: Several diagrams of grease flow behavior may be illustrated on the same sheet).

2. Obtain the NLGI limiting viscosity (apparent) of the dispensing equipment from Figure 3.

3. Establish the point of intersection of the NLGI limiting viscosity of the pump and the apparent viscosity curve. This point indicates the lowest temperature at which a given pump-grease combination should be expected to yield a delivery of two ounces per minute for the applied air pressure.

Patents and Developments

Perhalogenated Compound Greases

Grease compositions made of mixtures of trifluorochloroethylene polymers are described in U. S. Patent 2,706,715 issued to The M. W. Kellogg Company. Such greases are claimed to be chemically and physically stable and useful over a relatively wide temperature range and have relatively low friction properties.

The grease composition of the patent comprises a mixture of trifluorochloroethylene polymers. Particularly, the grease composition is composed of a normally liquid polymer of trifluorochloroethylene and a high melting point waxy polymer of trifluorochloroethylene. The normally liquid component of the grease boils within the range between about 150° F. and about 450° F. at one millimeter of mercury absolute pressure. The high melting point waxy component of the grease melts at a temperature above about 350° F., preferably between 380° F. and 410° F.

The grease composition contains preferably between about 6 and about 16 weight per cent of the wax component. The grease composition is prepared by admixing the oil and wax components of the grease in a mixing vessel and stirring gently. The mixture is heated to a sufficiently high temperature to form a homogeneous mixture with continued stirring. While continuing stirring, the tempeature is raised to the boiling point of the mixture and thereafter, the material is poured into a container and cooled to about room temperature to solidify the grease.

The finished grease is a white, wax-like material having a relatively low coefficient of friction and resembles tallow in appearance. The melting point of the grease will depend upon the physical properties of the components and the ratio of oil to wax in the grease. Generally, the melting point of the grease is above about 150° F.

It is believed that the wax component of the grease sorbs the liquid component thus retaining the body characteristic of the wax. At least 3 weight per cent of the wax component is necessary to obtain a sufficiently firm body in order that the grease will retain its shape. More than 25 weight per cent of the wax component results in cracking and shrinkage of the grease and, in general, causes the resulting product to have inferior qualities.

The oil and wax components of the grease are obtained by the polymerization of trifluorochloroethylene, a perhalogenated olefin. The preferred method of preparing the oil component of the grease is by the polymerization of trifluorochloroethylene at a temperature between about 150° F. and about 400° F. in the presence of a chain transfer solvent, such as chloroform, and a promotor, such as benzoyl peroxide. The polymerization product obtained by such polymerization is an oily substance containing oils, greases and relatively low melting waxes. This crude polymer is subjected to cracking at a temperature between about 650° F. and about 750° F. The product of the cracking operation is then preferably subjected to stabilization by reaction with chlorine trifluoride and subsequently with cobalt trifluoride. The stabilized cracked oil is fractionated into various fractions by distillation under subatmospheric pressure.

In a preferred example, the fluorinated oil thus obtained is distilled to obtain five fractions, the last being the residue. The boiling point-viscosity relationships of these fractions are given in Figure 1, while Figure 2 shows their density-temperature relationships.

The wax component of the grease composition of the present invention is prepared by emulsion or dispersion polymerization of trifluorochloroethylene in an aqueous solution of ammonium or potassium persulphate at a temperature between about 140° F. and about 200° F.

HARSHAW LEAD BASE

Harshaw Lead Base, as an additive to petroleum lubricants, improves extreme pressure characteristics and imparts the following desirable properties:

- Increased film strength
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- Improved wetting of metal surfaces
- A strong bond between lubricant and metal surfaces
- Resistance to welding of metals at high temperatures
- Moisture resistance and inhibits corrosion

Harshaw Lead Bases are offered in three concentrations to suit your particular needs:

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PETROLEUM CHEMIST WANTED

To work on research and manufacture of lubricating greases and oils. Must have experience in development and possess plant operational knowledge of manufacture of greases, motor oils, metal cutting oils and soluble oils. Education level—B.Sc. or B.A. minimum. Age 25-55. Salary commensurate with previous experience and ability to contribute to technical group work. Location of employment:

Canadian Oil Companies, Limited
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Montreal, Quebec, Canada.

Apply to this address, Care of Research Department.

and autogenous pressure. The preferred ratio of water to monomer is about six to one. The amount of ammonium, or potassium persulphate, based on monomer, is about 3 weight per cent. Preferably, an activator, such as sodium bi-sulphite is employed in equimolar quantities with the persulphate. After about thirty hours of residence time the polymer is separated from the emulsion or dispersion by filtering, followed by drying. This polymer, thus separated, is a hard wax, having a melting point of about 385° F. and may be used, without further treatment, as the wax component of the grease composition of this invention.

Various combinations of the oil fractions and the wax component may be employed as the final grease composition of this invention. In any case, the wax component of the grease is within the limits of about 3 to about 25 weight per cent. Any one of the oil fractions may be combined with the wax component to make up the final grease composition without departing from the scope of this invention. The residue, or wax fraction, obtained by the distillation of the fluorinated oil may, also, be included as a third component of the grease. The oil fractions boiling below about 375° F. at one millimeter of mercury absolute pressure when combined with the wax component make an ideal high speed, low film strength grease. Those oil fractions boiling above about 375° F. at one millimeter of mercury absolute pressure when combined with the wax component, in accordance with this invention, make ideal low speed, high pressure greases having relatively high film strength. The use of the residue, or wax fraction, obtained by the distillation of the fluorinated oil increases the film strength of the grease and generally makes the grease composition more suitable for low speed, high pressure work.

The following is an example of a grease prepared in accordance with the patent:

An oil of the characteristic and properties of the second fraction previously described and a residue of the nature of the residue fraction previously described was admixed with a high melting point polytrifluorochloroethylene wax, melting at a temperature of about 385° F., in amounts sufficient to render the final composition about 75 per cent of oil, 10 per cent of residue or low melting point wax and 15 per cent of high melting point wax. The method of preparing a grease of the above composition constituted admixing the oil and the low melting point wax or residue in a vessel and heating the mixture to a temperature of about 230° F. with gentle agitation. At this point, the high melting point wax was added with agitation and the resulting mixture heated to 400° F. When the mixture became clear at this temperature, it was poured into a container and cooled to room tem-

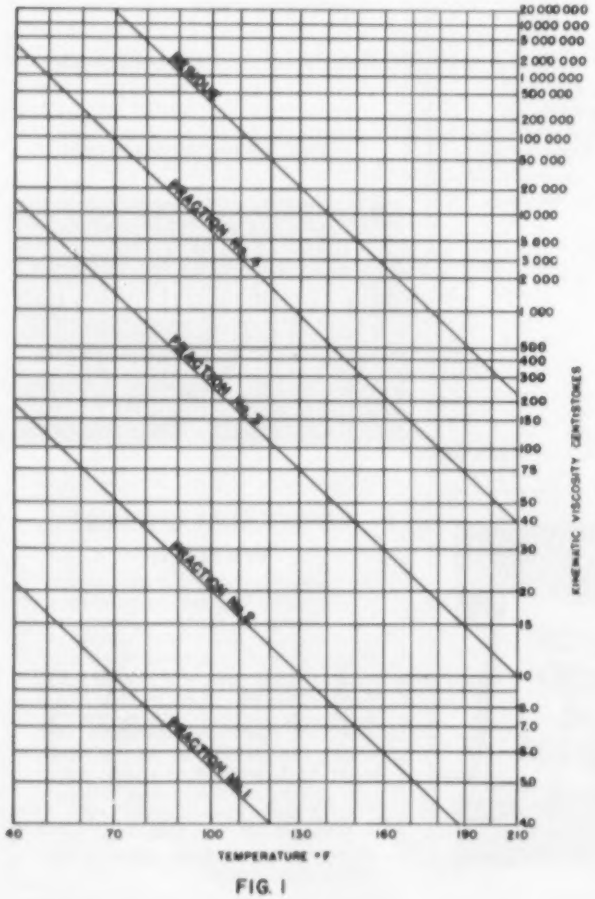


FIG. 1

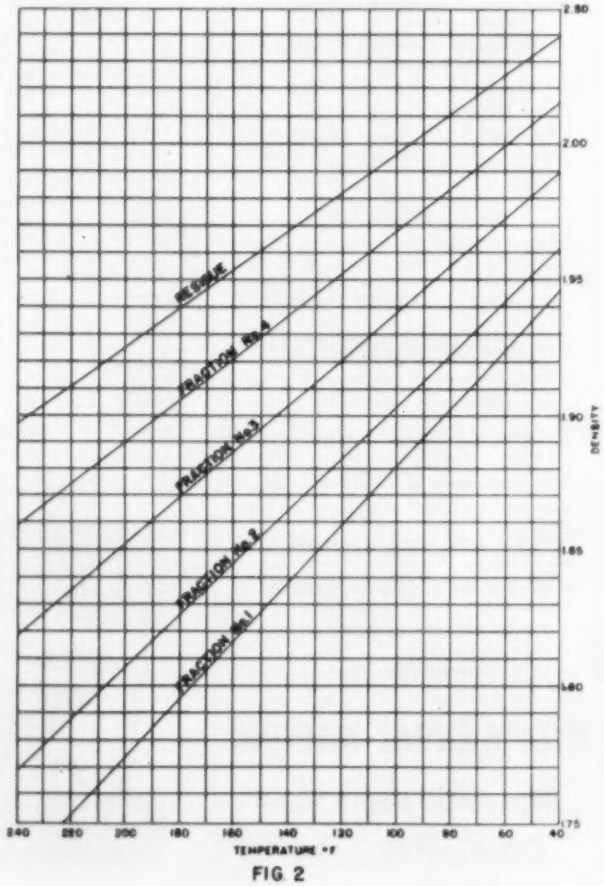
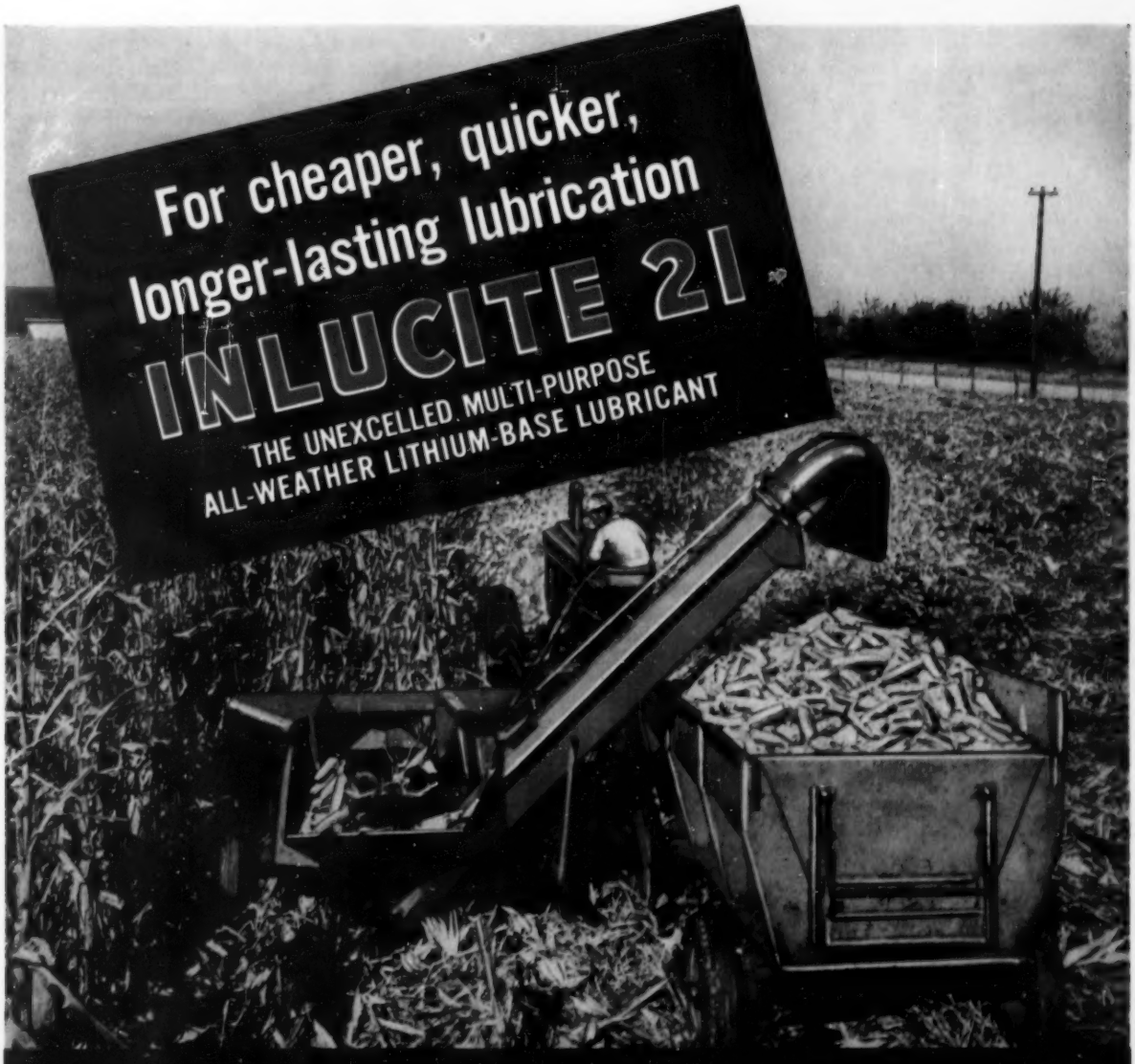


FIG. 2



INTERNATIONAL LUBRICATION

Because Inlucite 21 lasts from **3 to 10 times longer** than ordinary greases, it means real savings at harvest time when the going is rough.

Inlucite 21 will not wash out . . . . it does not "thin out" . . . . it absorbs more moisture and **stays put** longer, giving hard-pressed farmers an extra margin of protection at times when regular lubrication may be neglected.

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There is only ONE Inlucite 21. Inlucite 21 is the registered trade name of the original lithium-base lubricant made under our exclusive patented process.

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Manufacturers of Quality Lubricants

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perature. The finished grease was a white wax-like grease, having a melting point of about 300° F. and a boiling point of about 400° F. The solidification point of the grease was about 252° F. and the temperature necessary for impregnating fibrous material was about 360° F. This grease was a suitable high pressure, low speed grease.

The grease of this invention constitutes a superior material for pump and valve stem packings on all inorganic aqueous systems including acids, caustics and salts. The grease, however, is not recommended for some organic systems because of the solvent action of the organic compounds in contact with the grease. The grease, can be impregnated in dry braided asbestos or other fibrous packing materials for use as packing glands, rings and bushings. In incorporating such a grease with fibrous packing materials, such as braided asbestos, the substances including the grease are separately heated to a temperature above its melting point, for example about 270° F., thereafter the packing material, such as asbestos, is immersed in the molten grease, removed and cooled to room temperature. Appearance of the impregnated asbestos or packing material will depend on the cleanliness of the operation. The polytrifluorochloroethylene grease provides adequate protection for the packing material, such as asbestos, and it is possible to substitute, for example, white asbestos for the commonly used abrasive blue asbestos.

Polytrifluorochloroethylene grease as a packing impregnant may replace paraffin wax, hydrocarbon greases and oils, tallow, Japan wax, palmoil and other common lubricants and greases now sold under the trade name of "acid packings." Many other applications of the grease are possible, such as in the field of oxygen manufacture, food processings and pharmaceuticals, where a grease or impregnating packing material of non-corrosive and non-reactive nature is required.

Dry Lubrication of Surfaces

Graphite has been known for many years to be one of the most successful dry lubricants ever discovered, and has been used alone for this purpose and also as an ingredient of lubricating compositions. However, dry graphite as ordinarily used, adheres to a friction surface for only a limited time and frequently requires replacement.

In accordance with Patent 2,703,768 issued to Electrofilm, Inc., graphite may be practically permanently bonded to the surface of the article being treated, and thus provide lubrication or protection for very long periods of time without any further treatment.

In general, the application of graphite as a lubricant in accordance with the patent involves the steps of preparing the article surface or surfaces for coating, applying thereto finely divided graphite and one or more bonding agents, and completing the process of fixing the material

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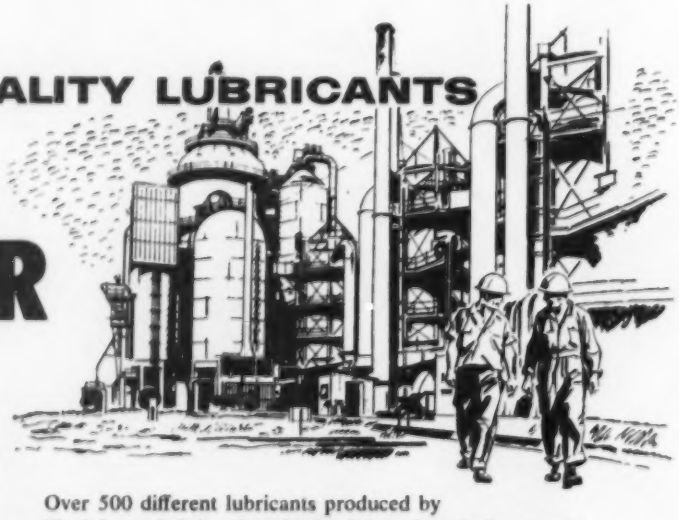

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and many other applications

Over 500 different lubricants produced by Sinclair are helping the wheels of American Industry turn faster — easier and more efficiently. Each one of these top-quality lubricants is *specifically* designed for a *specific* need . . . each is a product that can be used with confidence.

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in place, usually by means of a curing or baking treatment. The exact procedure to be followed will vary considerably depending upon the types of surfaces to be treated and the usage to which the coated surface is to be subjected.

For example, certain friction surfaces such as those composed of ordinary iron or steel may be prepared by either ordinary sandblasting or a phosphate type of coating treatment forming crystalline iron phosphates on the surface and well known commercially under the names "Parkerizing," "Bonderizing" or "Lubrizing." The surface obtained by the latter treatment is more resistant to corrosion than the plain iron or steel surface and receives readily a coating of finely divided graphite in a resinous vehicle. A suspension of the finely divided graphite in a resinous vehicle may be applied to the prepared surface in any suitable manner as by spraying, dipping, brushing or the like, and the coated surface is then heated or baked to cure the resinous material and form the desired bond. The graphite thus becomes embedded in and firmly bonded to the crystalline steel or iron surface.

The vehicle used for any of these coatings may be in liquid or paste form but should be carefully selected in order to obtain satisfactory results. The vehicle should contain a thermo-setting bonding agent capable of forming a strong bond that does not deteriorate under the influence of heat and pressure, that is resistant to the action of oils, lubricants, gasoline and the like, and that will not become brittle in use. Such a vehicle should also be capable of holding the graphite properly in suspension and not permitting it to settle out before or after the coating is applied.

One material that has been found particularly suitable as a vehicle for the coating is a preparation of the copolymers of vinyl chloride and vinyl acetate mixed with a thermo-setting resinous material, such as a "B" stage phenol formaldehyde resin. Other organic resins which may be used are the silicone resins, alkyd resins and other vinyl resins. The choice of bonding agent will depend largely on the use to which the graphitized surface is to be put and the nature of the surface that is coated. The use of a resinous bonding agent having a thermo-setting property is particularly desirable for assuming maximum permanency of the bonding effect.

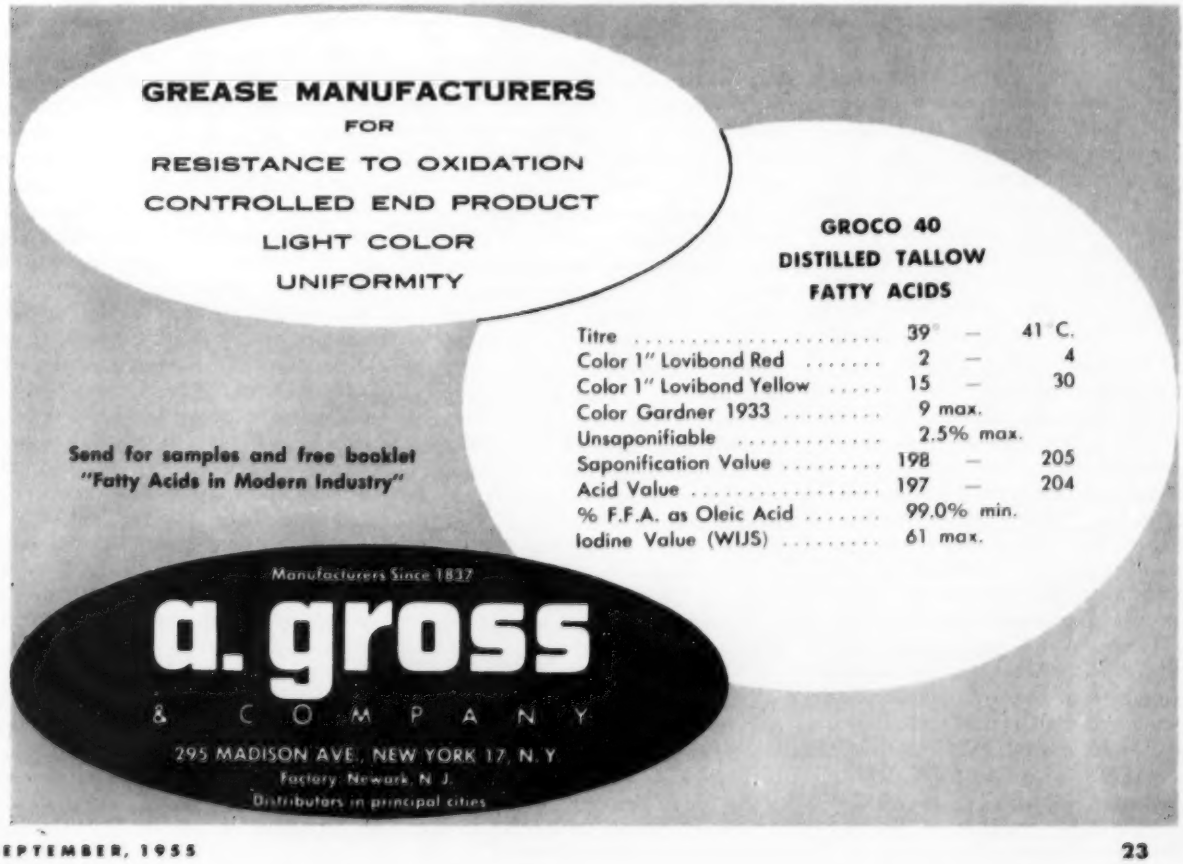
News Items

Standard Oil Co. (Calif.) claims that its Calol industrial grease is tough, water-resistant and can withstand severe heat. It can be added to conventional greases without disassembly and cleaning of bearings (Wall St. J. 5/23/55, p. 9).

A multi-purpose valve lubricant is said by Rockwell Mfg. Co., Pittsburgh, to have good metal-wetting properties from -40 to 500° F., and to be unusually resistant to mixtures of hydrocarbons and alkaline solutions (Paper Trade J. 6/6/55, p. 40).

Predicting grease viscosities (nomograph), also method for measuring apparent viscosity of grease—Dreher et al (Petr. Refiner 6/55, p. 165).

U. S. Patent 2,711,849—Lube-Tube Corp. Filling apparatus for filling receptacles with grease.



The Man Behind the Dollar . . .

W. B. RICE, Plymouth Director of Service

When you talk about "good service," the subject may bring to mind many connected with the auto industry. Whether they are associated with the sale or its goods or its services, however, one thing is certain: successful men have always run their businesses on the premise that the *customer* is and always will be the most important part of the business.

This may appear to be an old fashioned, simple notion, even so elementary as to be out of keeping with some of the seemingly more powerful, more modern merchandising ideas circulating about in these times. However, if we expect to progress, we shouldn't overlook or discard entirely a basic idea because of its age or simplicity alone. Just as the foundation of a modernized building may remain unchanged, so the fundamental element of good merchandising still revolves around one fundamental—the individual needs of the *customer*.

By providing good service in the form of proper treatment of the customer, I do not in any way want to imply that the customer should be catered to. An artificial kind of agreeableness, as a substitute for real service, is insulting. In my humble opinion, good service begins with putting yourself in the customer's shoes, adopting his point of view, and treating him as you, yourself, would like to be treated.

This means that of greatest importance is the customer's first impression and the impression he retains all the while he is your customer—an entirely favorable one when governed by promptness of service, fairness in dealing and reasonable prices, based on a job well done. Price is sometimes given a more important status in our dealings with customers, but if you will stop to think about price alone for a moment, I'm sure you'll agree that it isn't all-important; time and again, it has been seen and proven that people prefer, above all to deal with someone they *know* and feel they can trust.

In the case of automotive service, car owners prefer to deal with someone willing to assume responsibility for taking care of their cars; someone willing to demonstrate that he has the customer's viewpoint and interest uppermost in mind.

W. B. RICE

Customer goodwill is something we earn by following through *after* the sale. A common feeling among car owners is that once they've established *regular* patronage, their business is taken for granted . . . and they are treated accordingly. Such a practice only destroys goodwill as fast as it can be built. Continuous good customer relations are the heart of any successful enterprise; where it is neglected you'll find a heavy turnover of customers. And when the time comes that the flow of customers begins to diminish, the reaction in sales is usually immediate. The vital reservoir of available business lies among the people who buy again and again. They are the needed cushion during slack periods and the basis for growth and expansion in good times. Customers who are treated according to the business barometer do not become customers at all, but "buyers," who disappear at the first sign of approaching clouds on the horizon.

In the automobile dealership, as in any business with many employees, dealers feel that the maintenance of good customer relations is the responsibility of every employee who comes in contact with the public. The building of good customer relations is rightly the individual employee's concern and responsibility because the reputation of the business can rise or fall on *individual* treatment of customers. But perhaps of even greater importance, management should always be prepared to lead the way with a definite program for employees to follow in practice, for it's still true that "the speed of the boss is the speed of the gang." The interest and enthusiasm employees show in doing a good job is in large part a reflection of the attitudes and leadership qualities of the owner of the business.

At Plymouth, we have always deemed it a welcome opportunity to assist dealers wherever and whenever possible in building better customer relations. At the same time, a great many dealers have taken the lead in this activity, so that today, out of this mutuality of effort, the Plymouth Customer Relations Forum has evolved. Briefly, the aim of the Forum is to assist dealers in maintaining friendly contact with owners who purchased their cars from them, to build goodwill and retain them as repeat customers. Using planned methods, the Forum helps in building a selling team of employees in every department of the dealership—new and used cars, service and parts—benefiting the dealership as a whole. It provides a "balance sheet" of customer relations, which in the final analysis, may be considered just as valuable as a balance sheet of actual sales.

For the test of good relations is found in the amount of goodwill any business enjoys through the good service it provides. A successful organization always aims high, not for the dollar, but the *man behind the dollar*.

PETRONATE

(Reg. U. S. Pat. Office)

. . . the oil-soluble petroleum sulfonate for all four major functions . . .

A Emulsification and Dispersion of Liquids

B Dispersion and Wetting of Solids

C Wetting and Dispersion of Liquid-Solid Systems

D Inhibition of Rust and Corrosion

PETRONATE is the general trade name given by Sonneborn to its various types and grades of oil-soluble petroleum sulfonates.

The chart suggests the broad range of uses for this material. A laboratory sample of PETRONATE will help you determine how its many advantages can be put to efficient use in your manufacturing processes.

Check the coupon below indicating the use intended so that we can send you the proper type of PETRONATE.

USES OF PETRONATE

APPLICATION	PRIMARY FUNCTION OF PETRONATE	SECONDARY FUNCTION
EMULSIFICATION AND DISPERSION OF LIQUIDS		
1. Insecticide Emulsions	Emulsifying Agent for Toxicant	Spreading Agent
2. Textile Oils	Emulsifying Agent for Textile Processing Oils	Wetting and Dispersing Agent for Textile Fibers
3. Leather Oils	Emulsifying Agent for Leather Processing Oils	Wetting and Dispersing Agent for Leathers
DISPERSION AND WETTING OF SOLIDS		
4. Rubber Manufacture	Thermo Plasticizing Agent	Increases Dispersibility of Filler
5. Fuel Oil	Keeps Sludge in Suspension	Prevents Segregation of Moisture
6. Printing Ink Manufacture	Aids dispersion of pigment	Reduces Viscosity of Ink
7. Ore Flotation	Flotation Reagent	Selective Wetting Agent
8. Additives for Lube Oil	Acts as Detergent	Inhibits Bearing Corrosion
WETTING AND DISPERSION OF LIQUID-SOLID SYSTEMS		
9. Crude Oil Emulsion Splitting	Reverting Agent for Water-in-Oil Emulsions	Aids in Wetting out Salts and Solids
10. Emulsifiable Solvent Cleaners	Dispersing Agent for Oil and Grease Deposits	Acts as Emulsifying Agent
11. Dry Cleaning Compounds	Linking agent for Water and Solvent	Loosens Dirt Absorbed by Fabric
12. Fat Splitting Process	Dispersing Agent for Solid Fats	Acts as Wetting Agent
INHIBITION OF RUST AND CORROSION		
13. Corrosion Preventive Compounds	Rust and Corrosion Inhibiting Agent	Acts as Moisture Barrier
14. Anti-Freeze Solutions	Rust and Corrosion Inhibiting Agent	Aids in Dispersion of Scale
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Vulcan Containers, Inc.
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Lincoln Engineering Company
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Representative—M. E. Wight

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Mid-Continent Bldg...P.O. Box 391, Tulsa, Okla.
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Valvoline Oil Company
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Everett 49, Massachusetts
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Representative—C. W. Nofsinger

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New York 20, New York
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Armour & Co., Chemical Division
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The McGean Chemical Company
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Les Laboratoires de Recherches Purfina
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Representative—R. Gillerot

Midwest Research Institute
425 Volker, Kansas City 10, Missouri
Representative—Dr. M. H. Thornton

Petroleum Educational Institute
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Representative—G. A. Zamboni

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PEOPLE in the Industry

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New Vice-President Named By Witco Chemical Company

Appointment of Henry W. Rojas as Vice-President of Export Marketing is announced by Max A. Minnig, Executive Vice-President of Witco Chemical Company.

Mr. Rojas, a specialist in export chemical sales, will be responsible for all present international operations of the Witco Chemical Company. In addition, it is expected that with his wide experience in this field, Mr. Rojas will increase Witco's activities in the export market by developing new outlets for the company's manufactured chemicals and carbon blacks. His headquarters will be in New York.

Mr. Rojas joins Witco after 28 years of worldwide chemical experience. For the past 21 years he has been with the American Cyanamid Company, most of the time as Export Manager of the Industrial Chemical Division and Manager of the Dyes and Chemicals Department of the Cyanamid Interamerican Corporation. He has traveled widely in Central and South America and Europe. He has been a member of the Export Managers Club of New York for over 10 years.

Acheson Colloids Appoints Zajac, Hunter

Fred Zajac has been appointed Detroit Service Engineer for Acheson Colloids Company, Port Huron, Mich., replacing Frank M. Hunter, who is returning to the company's headquarters at Port Huron where he will supervise the laboratory phase of Acheson's Sales Engineering program.

Servicing all of Northern and lower Michigan, with headquarters at 3000 East Grand Blvd., Detroit 2, Mich., Mr. Zajac will provide technical assistance to industries using colloidal graphite and other Acheson products.

After receiving a B. S. degree in Industrial Engineering from the Lawrence Institute of Technology, Mr. Zajac worked for the Jergens Tool Specialty Co., as a sales engineer. During World War II, he served with the Coast Guard and Navy in the European Theater of Operations. He is a member of the American Society of Tool Engineers.

Mr. Zajac, a native of Dearborn, Mich., is treasurer of the Dearborn-Lindbergh School Parent Teachers Association.

Mr. Hunter, after receiving B. S. and M. S. degrees in chemistry from Michigan State College, worked for the Chrysler Corporation, Hudson Motor Company and the Mueller Brass Company, among others. During World War II, he was with the Chemical Warfare Service. He joined the Acheson Colloids Company in December, 1953, and has been Sales Engineer in the Detroit office.

Shell Names Vice-Pres. to Head Public Relations

Harold L. Curtis has been appointed to the newly-created post of vice president in charge of public relations for Shell Oil Company, H. S. M. Burns, president, announced today.

The appointment marks the first time a major oil company has assigned a vice president exclusively to public relations.

Mr. Curtis, who has been assistant to the president with responsibility for public relations since 1947, has guided the development of a nationally-distributed film collection, a nation-wide women's travel program and an information program, including advertising and the publication of many books and pamphlets on petroleum and related subjects. He now heads a department headquartered in New York, with public relations representatives in Shell offices throughout the United States.

A native Californian, he joined Shell in 1923 as a service station attendant in San Jose. He served as district manager in Fresno and San Jose, and as division manager in Sacramento before being promoted to the post of New York division manager in 1936. He was made manager of the advertising department in 1938 and in 1943 he became assistant to the president with the responsibility for coordinating the company's advertising, per-

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Aluminum Stearates
Medium to extremely high gel

Lithium Stearate
For wide-temperature range, water-resistant, transparent greases

Lithium Hydroxystearate
For synthetic and multipurpose greases

Barium, Calcium, Lead, Magnesium and Sodium Stearates

Witco's experience with a variety of oils can help you select a stearate that's *tailor-made* for your operating conditions and product requirements.

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35 Years of Growth

sonnel and public relations activities. Shortly after this appointment, on special assignment, he made the initial studies which led to the establishment of Shell's post war planning program. He has devoted full time to public relations since 1947.

Mr. Curtis is a member of the executive committee of the United States Committee for the United Nations. He is a coordinator for the Advertising Council and has served as chairman of Oil Industry Information Committee subcommittees on advertising, films and employee information. He is a vice president and director of the Douglas Manor Association and a member of the Public Relations Society of America.

Mr. Curtis lives in Douglaston, Long Island, with his wife and two daughters, Jane and Daryl.

Du Pont Appoints W. S. Carpenter III

W. Samuel Carpenter, III, has been named assistant director of sales of the Du Pont Company's Petroleum Chemicals Division, it was announced today by David H. Conklin, director of sales.

Mr. Carpenter succeeds M. H. Campbell, who has been transferred to the new isocyanates sales section in the Elastomers Division. The new assistant director of sales comes to the Petroleum Chemicals Division from Du Pont's Textile Fibers Department where he was director of manufacturing for the cellulosics division.

A chemistry graduate from Princeton University, Mr. Carpenter joined the Du Pont Company's Organic Chemicals Department in 1938 as an industrial engineer. In 1944, he was assigned to construction operations at Hanford, Wash., where the government's atomic energy project was built and operated by Du Pont during World War II.

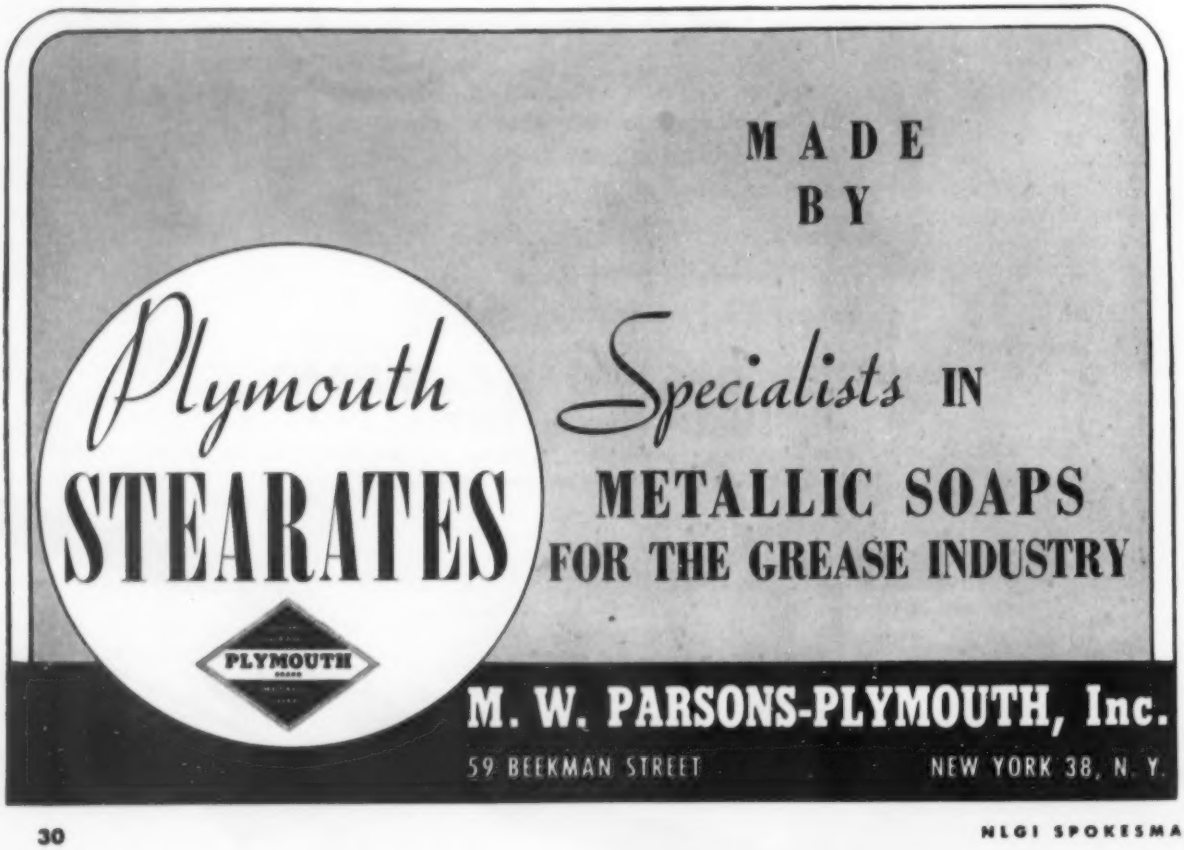
Mr. Carpenter returned to Wilmington in 1945, entering the Construction Division of the Engineering Department. The following year he became manager of that department's Planning Division and later manager of its Industrial Engineering Division. In 1947, he became assistant to the director of production of the Rayon Division of the former Rayon Department and in 1949 became assistant manager of "Cordura" high-tenacity rayon yarn sales. In August of 1950 he was made assistant manager of the Rayon Department Planning Division.

Climax Molybdenum Appoints Smith

Appointment of Elwin E. Smith as manager of lubricant development in the chemical division of Climax Molybdenum Company was announced today by Dr. Charles H. Kline, manager of the division. In his new capacity, Mr. Smith will explore and develop new applications of molybdenum disulfide lubricants.

Mr. Smith was formerly with Cities Service Oil Company as manager of industrial sales for the New York region. Prior to that, he was with the Diamondhead Oil Company as a sales engineer.

Following Army service, Mr. Smith organized his own company, the Refining Company, in New Rochelle, New York. He was graduated from the University of Alabama in 1944 with a degree in Chemical Engineering.



Continental Can Announces Purchasing Realignment

Continental Can Company has announced a change in its head office Purchasing Organization which establishes D. N. Rabishaw as manager of purchases for Coatings and Chemical products and J. J. Sherlock as manager of purchases for Paper and Petroleum products. This realignment of functions among Continental's top Purchasing staff has become necessary by reason of the increased volume and variety of purchases in the several product divisions of the Company.

In his new capacity, Mr. Rabishaw will be responsible for Continental's contract purchasing and general policy determinations on the following group of products: coatings and enamels, adhesives, chemical products, lithograph and printing inks, plastic resins for molding extrusion and casting, cellophane and plastic films, can end sealing compounds, seam cements, fluxes and foil.

Mr. Sherlock will have responsibility for purchasing policy and contract purchases of paper, paperboard, cartons and pallets, cork and petroleum products, including oil and grease, wax, thinners and solvents.

Mr. J. J. Schneewind continues as manager of Plate Purchases and Mr. W. L. Dykema remains in his capacity as manager of purchases for Equipment and Supplies. All purchasing managers report to Mr. R. D. Weinland, general manager of purchases.

U. S. Steel Appoints G. A. Price

Griswold A. Price has been appointed assistant vice president-sales-western area, for the United States Steel Corporation, it was announced today by Marcus J. Aurelius, vice president and general manager of sales, to be effective August 1, 1955. Mr. Price succeeds Herbert J. Watt who is retiring on that date after 43 years service as a sales executive in the steel industry.

A native of Chicago, Mr. Price attended schools there. His entire business career has been with the United States Steel Corporation, having started as a student in the Gary Steel Works upon graduation from Northwestern University in 1919. He transferred to the Chicago office in 1920, serving there in various capacities, and was a salesman in the Chicago bar, strip and semi-finished materials division when he was made assistant manager of sales in the St. Louis district sales office in 1931.

Before returning to Chicago in 1935 as assistant general manager of sales of the bar, strip and semi-finished materials division of the Illinois Steel Company, Mr. Price had been made manager of sales in St. Louis. Later on that year he moved to Pittsburgh as manager of sales of the bar, strip and semi-finished materials division upon the formation of the Carnegie-Illinois Steel Corporation. He was appointed manager of sales of the Chicago district sales office in 1939 and then manager of the Chicago district office in 1947.

Mr. Price has been active in many civic and business organizations in the Chicago area. He is a member of the Chicago Club, the Indian Hill Club,

MALMSTROM NIMCO WOOL FAT & LANOLIN

Lubricating grease manufacturers know that top value and peak performance go hand-in-hand. That's why Malmstrom's NIMCO brands are specified. N. I. Malmstrom – largest processors of wool fat and lanolin products – produce quality components for grease production.

N. I. MALMSTROM & CO.

America's Largest Processor of Wool Fat and Lanolin

147 Lombardy St., Brooklyn 22, N. Y.
612 N. Michigan Ave., Chicago 11, Ill.

COMMON DEGRAS
NEUTRAL WOOL GREASE

A small percentage of NIMCO Wool Grease Fatty Acids—naturally saturated fatty acids (free from rancidity)—gives your grease top stability, better performance. Write today for working sample.

WOOL GREASE FATTY ACIDS

Moisture	2% max.
Unsaponifiable (Wool Grease Alcohols)	6% max.
Saponifiable	94%
Free Fatty Acid (as oleic)	55-60%
Actual Free Fatty Acid Content	90%
Saponification No.	120-130
Free Inorganic Acid	0.2% max.
Iodine Value	20-40
Apparent Solidification Point (titre)	Approx. 44° C.
Softening Point	45-48° C.
% Sulfur	No corrosive sulfur

A.O.C.S. Methods

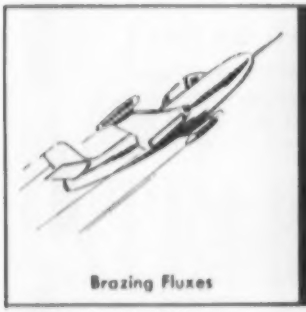
CATALYST
OF
INDUSTRY

LITHIUM

the Miracle Element

cat'a-lyst: chem., the causing or accelerating of a chemical change by the addition of a . . . [catalytic agent] . . .

From air conditioning to welding fluxes, Lithium chemicals are the catalysts of industry. Multi-purpose greases, porcelain enamels, organic chemicals, pharmaceuticals, electric storage batteries, heat treating, glazes, electronic ceramics, metallurgy, brazing fluxes—all boast products made better by the addition of Lithium. Architectural porcelain enamels, porcelainized aluminum, low temperature heat treating, cermets, deicing of parked aircraft—these are wholly new fields with an interest in Lithium. Why don't you consider the possibilities Lithium offers for your production process? Investigate the profit potentialities of this wonder metal. We will be glad to discuss it with you.



Brazing Fluxes

Organic Chemistry

Air Conditioning

Multi-Purpose Greases

. . . trends ahead in industrial applications for Lithium

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MINNEAPOLIS 2, MINN.

MINES: Keystone, Custer, Hill City, South Dakota • Bessemer City, North Carolina • Cat Lake, Manitoba • Amos Area, Quebec • BRANCH SALES OFFICES: New York • Chicago
CHEMICAL PLANTS: St. Louis Park, Minnesota • Bessemer City, North Carolina • RESEARCH LABORATORY: St. Louis Park, Minnesota

the University Club of Chicago and the American Iron and Steel Institute.

J. W. Roach to Assist Kerr-McGee President

Jack W. Roach, presently vice president of Deep Rock Oil Company, has also been named assistant to the president, F. C. Love. He will continue to maintain his office in the Kerr-McGee building at Oklahoma City.

In his new capacity, Roach will coordinate activities of Deep Rock's research and development department, and, in addition, will be in charge of special projects assigned from the president's office. Among the first of these projects will be a study to determine the steps to be taken to further increase the octane of gasoline manufactured at the company's refineries.

Robert M. Chesney, vice president who is in charge of the company's Cushing refinery, has also been placed in charge of Deep Rock's Wynnewood plant. He is moving his office from Cushing to the Kerr-McGee building in Oklahoma City where he will co-ordinate the operations of both refineries.

Socony Mobil Makes Personnel Changes

Socony Mobil Oil Company, Inc. has made a number of organizational changes in its New York City marketing division.

Charles P. Price of Manhattan, formerly Manhattan district sales manager, and E. H. Strickland of Valley Stream, Long Island, formerly Brooklyn district sales manager, have been transferred to division headquarters at 230 Park Avenue to handle special assignments. Mr. Price and Mr. Strickland have been with the company since 1922 and 1917, respectively.

G. A. Klaffky of Huntington Bay Hills, Long Island, succeeds Mr. Price as Manhattan district sales manager. He has been with the company since 1939 and was formerly Bronx district sales manager.

Succeeding Mr. Klaffky as Bronx district sales manager is W. J. Ancker of Yonkers. He was formerly retail marketing assistant at the Bronx office. He joined Socony Mobil in 1939.

The new Brooklyn district sales manager will be Lambert G. Vaile, of Valley Stream, Long Island. Mr. Vaile joined the company in 1945 and was formerly retail marketing assistant for the Queens District.

Monsanto Promotes Drs. J. D. Calfee and W. R. Richard

Dr. John D. Calfee and Dr. William R. Richard, have been promoted to section leader and group leader respectively, it has been announced here by E. W. Gluesenkamp, director of chemical research for Monsanto Chemical Company's Research and Engineering Division.

Calfee will be in charge of certain phases of polymer research underway at the Central Research Department in Dayton, while Richard will be a group leader in the same section.

A native of Kentucky, Calfee joined Monsanto in 1950 as a group leader in the Central Research Department. He obtained a B. A. degree from Parks College in 1932, M. S. degree from the University of Tennessee in 1934, and Ph. D. degree from Duke University in 1938.

Richard joined Monsanto's Plastics Division after he completed work for a B. A. degree in chemistry at Amherst College in 1943. He left the company to return to school in 1946, and received an M. S. degree in chemistry in 1947 and a Ph. D. degree in chemistry in 1950, both from the University of Michigan.

Witco Appoints W. C. Walker

Announcement is made of the appointment of W. C. Walker as Assistant to the Vice President in Charge of Advertising and Public Relations of Witco Chemical Company, 122 East 42 Street, New York.

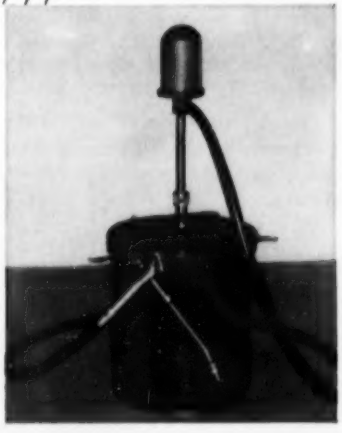
A graduate chemist, Mr. Walker was formerly associated with Chas. Pfizer & Co., Inc., where he was in the public relations department.

Prior to joining with Pfizer in 1944, Mr. Walker was employed in the Research Department of the Socony-Vacuum Oil Co., where he worked on plastics, detergents, and hydrocarbons. He also spent a year and one half in the design and operation of a pilot plant for the sulfonization of petroleum.

Mr. Walker graduated from the Sheffield Scientific School, Yale University, in 1939.

NOW THE Super HEAVY DUTY GRE-ZER-ATOR

*An all-weather grease gun designed especially for lithium and other multi-purpose greases.



- New Hydrojet Pump gives greater pump pressure and capacity. Requires neither air, electrical connections . . nor regular filling of air in pump unit.
- Reversabout Pressure Booster allows push or pull handle operation—can develop more than three tons of pressure.
- Complete one-unit operation — always ready for instant use.
- No special filling equipment required—offers convenient and continuous lubricating service.
- All-steel construction and rust-resistant finish makes the new Heavy-Duty GRE-ZER-ATOR a rugged and dependable unit.

Write for complete information on all Zee Line equipment. New regular model Gre-Zer-Ator is available now. Let us serve you.

NATIONAL SALES, INC.
812 NORTH MAIN • WICHITA 5, KANSAS

NEW MEMBER

Baum's Castorine Co., Inc. Joins

NLGI Welcomes Baum's Castorine As an Active Member

NLGI Technical Committee Member

CHARLES F. MOWRY

Charles F. Mowry was born in Rome, N. Y. in 1928. He attended the St. Lawrence University at Canton, N. Y. and majored in both Chemistry and Business Administration. He is a member of the Gamma Sigma Epsilon Chemical Fraternity and the Phi Sigma Kappa national social Fraternity.

Baum's Castorine Co., Inc., has been a family business for many years and as such, Charles F. Mowry gained an early interest in grease and chemical manufacturing. He assisted in the laboratory and with the compounding for a period of six years during school vacations.

After completion of his college work in 1948, he became a full time Chemist for Baum's and supervised compounding and blending operations.

He was elected Secretary and Assistant Treasurer at the Annual meeting of stock holders and Directors in 1949.

During the period 1951-1955, he specialized in the field of manufacture and control of non-soap lubricating greases.

Mr. Mowry is married and has three children, two daughters and a son. He maintains an active interest in many hobbies which include cabinet making, skiing, tennis, swimming and sail boat racing, having previously served as the Commodore of the Lake Delta Yacht Club. At the present time, he is more than actively engaged in building his own home.

NLGI Company Representative

THEODORE J. MOWRY

Theodore J. Mowry II was born in Rome, N. Y. in 1924. He graduated from Manlius Military Academy in 1942 and served in the 45th Infantry Division during World War II. He took part in the Sicily and Italy invasions and was wounded twice. His service awards include the Purple Heart with one Oak Leaf Cluster, Presidential Unit Citation, Combat Infantryman Badge, Sharpshooters Medal, European African Middle Eastern Campaign Ribbon with two battle stars, the Good Conduct Medal and the Victory Medal.

Prior to the war, he worked summers and part time as a laborer in the plant and became thoroughly acquainted with operations fom the bottom up. Upon discharge from the Army in 1945, he joined the company and served as Production Manager until 1949. In 1946, he succeeded Lyndon E. Rebe as Secretary and in 1949 was elected Vice-President, in which capacity he is still serving.

Mr. Mowry is married and has three children, two daughters and a son.

He has an active interest in music, gardening, boating and swimming.

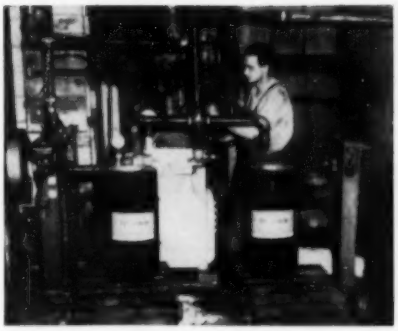
History of Company Baum's Castorine Co., Inc.

The company was organized in Syracuse, N. Y. in 1879 and built an exceptional reputation with its line of

Section of manufacturing plant showing grease kettles on 2nd floor of compounding room. 17 kettles are used for compounding and blending.

castor oil based wagon greases, axle oil and a complete line of harness and leather treating products. Baum's was going strong at the time of the Columbian Exposition in Chicago in 1893. Excerpts from the fair's handbook said that the preparations "commanded extensive sale all over the world." "The products of this company," the hand book stated, "include Baum's Castorine Axle Oil, Carriage Top Enamel, Sperm Harness Oil, Black Castile Harness Soap, Leather Dyes and Wagon Greases, and they are all compounds of distinctly superior character. They are, in fact, conceded to be the very best line of horse owner's supplies ever offered for sale and receive a degree of recognition accorded to none other."

In 1903, the late Theodore John Mowry purchased the company with several other Romans as stockholders and directors. They included Mrs. Theodore J. Mowry, James S. Dyett, J. H. Dyett and H. T. Dyett. Three



View of homogenizer showing milling of grease prior to packaging.

years afterward, the late Theodore Clayton Mowry, son of Theodore J. Mowry, purchased stock and became associated with the company. The corporation was then dissolved and a partnership formed between Theodore J. Mowry and his son Theodore Clayton Mowry. The company was again incorporated in 1926 after the death of Theodore J. Mowry and continued under Theodore Clayton Mowry, President up until his death in 1938. Operations were then carried on under the management of W. K. Freson, Vice-President and Lyndon E. Rebe, Secretary, with Mrs. T. Clayton Mowry serving as President and the controlling stockholder of the corporation. Lyndon E. Rebe left the company in 1946 and was succeeded by Theodore J. Mowry II. W. K. Freson left the company in 1948, after which Theodore J. Mowry II became Vice-President and Sales Manager and Charles F. Mowry, Secretary and Assistant Treasurer and Chief Chemist, with Mrs. T. Clayton Mowry as President.

The first Rome location was at 106 N. George St. until 1913 when property was acquired and a new plant built to accommodate the growing automotive field. The company expanded its grease making facilities during World War II when it supplied large quantities of calcium base greases for military use. Shortly after the war, the company began making sodium soap base greases and special wire drawing lubricants that fitted in with their expansion in the soap making field. The growth in soap making was a natural outcome of the grease business and balanced out production during the slow winter months caused by inactivity of the automobile market.

In the early 1930's, the company developed a complete line of lubricants, soaps and cleaners for the farm trade and had 40 salesmen covering the Atlantic states, with warehouses in several states. Quality and uniformity have been the by words of the company since its beginning and sold under the trademarks "Castorine." Castorine Motor Oil was selected by Admiral Byrd for his 1939 expedition to the Antarctic, on the basis of tests conducted for engine deposits, engine wear and durability of the oil under extreme conditions.

After World War II, the company gradually shifted to the industrial market and today has a specialized line of lubricants under the trade-mark of "Castorine Tena-Film," which it sells in New York state, the New England states, Pennsylvania, Kentucky and Ohio.

The entire plant is now located at 200 Matthew St. in Rome, N. Y. and

Section of oil and grease finished goods stock room.

consists of a two-story manufacturing plant 90 ft. x 40 ft. and has a battery of 17 compounding and blending kettles. Attached to the south end of the building is a boiler room that supplies heat for processing. The office, laboratory and chemical storage is in a two-story building adjacent to the manufacturing building and is identical in size. A large one-story warehouse is connected to the first floor of the manufacturing plant. The company has a railroad siding and also a shipping dock for truck shipments.

Theodore J. Mowry II, Vice-President and Charles F. Mowry, Secretary and Assistant Treasurer are the third generation of the family to serve as company officials.

★

Between 50 and 75 per cent of the current consumption of gasoline and lubricating oils is used to move traffic along America's paved roads and streets, most of which are covered with asphalt, an oil product.

NEW MEMBER

Bechem-Rhus-Werke and Republic Steel Corporation Join

NLGI Welcomes Bechem-Rhus-Werke as Active Member Republic Steel Corp. as an Associate Member

History of the Oldest German Lubricant Manufacturing Firm

It was in the year 1834 when Carl Bechem founded the oil factory and refinery, Carl Bechem, in Hagen, Westphalia, mother house of the Bechem-Rhus-Werke, which is to this day owned by his family. Thus, the firm looks back to a venerable tradition of more than 120 years and during that period it has participated in all steps of development in the way of lubricants. During the early decades of its existence, the firm Bechem refined and utilized fatty oils such as rapeseed oil, olive oil as well as tallow for producing lubricants. In rolling mills, it introduced the lubricant by way of flitches of bacon as a forerunner of present-day brick lubrication.

About the year 1870, the first change in favor of mineral oils was effected. It sounds like an anecdote but is shown by historical proofs that the principal of the firm Bechem in those days threw out on the street the representative of a mineral oil company coming from America and offering for the first time mineral oil for lubricating purposes, with the words "you are a fraud!"

However, a change-over to this novel lubricant was effected quite rapidly, and the firm Bechem can point with pride to the fact that it was the first German oil company to import mineral oils from U.S.A. for lubricating purposes.

An alogous to the rapid technical progress, the oil factory Carl Bechem with the associated firm of Bechem-Rhus-Werke have taken a stormy development. This is particularly true with regard to the quality of the products manufactured here. The complete demolition of the plant in Hagen during the last months of the second world war made compulsory the new erection of the productive plant. This opportunity was taken to select all mechanical equipment on the basis of the most recent developments in the way of lubricating grease production and to install the same. As a consequence, Bechem-Rhus-Werke combines a venerable tradition with an up-to-date manufacturing program. The result of the firm's endeavors are products of the very highest order in the way of anti-friction bearing greases as well as the heavy special greases for rolling mill lubrication.

The Oelfabrik Carl Bechem, organically associated with Bechem-Rhus-Werke feature in particular maximum-pressure gearing oils such as demanded in modern mining drawing engine drives, as well as metal working oils of the type soluble or insoluble in water.

Republic Steel Corp. Enters Field in 1936

Republic Steel Corporation entered the steel shipping container field in 1936 by acquiring the Niles Steel Products Company, Niles, Ohio, manufacturers of 55-gallon oil and grease drums, 100-lb. grease drums, and 5-gallon pails.

In 1945 they acquired the Stevens Metal Products Company, of Niles, Ohio, manufacturers of steel barrels 19-gauge and heavier, giving them a complete line of steel shipping containers for petroleum products, including gasoline.

The line of products now embraces all standard packages from 3½ gallon (25-lb.) 26-gauge pails, to 55-gallon 12-gauge drums, including their own facilities for hot dipped galvanized, hot dipped tinning, lithographing and printing. One of the early developers of high bake lacquer linings for barrels, facilities are now complete for one and two coat applications.

The plants are now designated as the "Niles Plant" manufacturing pails, 100-lb. grease drums and 15-gallon oil drums, and the "Stevens Plant" manufacturing all barrels 20-gallon and larger.

Mr. Theodore G. Humphrey, Manager of Sales, will represent this new member as both company representative and on the Technical Committee. He started with this Division in September 1936, shortly after Republic entered the field, having formerly been with Wheeling Steel Corporation in the same field of endeavor.

Black or Light

METASAP* ALUMINUM STEARATES make specialty greases 6 WAYS BETTER

Whether you're making black oil greases or clear lubricants, you'll find the use of Metasap Aluminum Stearates will solve your manufacturing problems, cut costs, give you a better finished product. Check these Metasap grease bases for economical production of lubricants with any desired body:

METASAP 598—high gel type for use where high yields are of paramount importance.

METASAP 537—produces a high gel for clear, transparent greases with good lubricating stability.

METASAP GM—gives a medium heavy gel where smoothness is of prime importance.

METAVIS 540—can be used with wide range of mineral oils; produces semifluid, adhesive-type lubricant known as castor machine oil; highly economical.

1. more stable at high temperatures
2. more water-repellent
3. more resistant to centrifugal action
4. smoother in texture
5. wider in applicability
6. more economical

Samples are available for experimental work. Our research and technical staff will be glad to help you select the correct base for any given oil, or achieve any desired effect in a finished grease through use of proper soap mixtures.

*Reg. U. S. Pat. Off.

METASAP CHEMICAL COMPANY, Harrison, N. J.

Branches: CHICAGO • BOSTON • CEDARTOWN, GA. • RICHMOND, CALIF.

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METASAP CHEMICAL COMPANY REG. U.S. PAT. OFF.

Stearates

of Calcium • Aluminum • Lead • Magnesium • Zinc

IOCA ANNUAL MEETING

Eighth Annual Meeting to Be Held at Chicago Bismarck Hotel, Sept. 26-27
Program Presents Excellent Speakers and Subjects . . .

"WHAT'S GOING ON WITH LUBRICATING GREASES?"

MR. H. L. HEMMINGWAY
General Manager, Sales-Service Departments, The Pure Oil Company, Chicago, Ill.

Here's a presentation that will bring you up-to-date on both the technical and sales aspects of the lubricating grease industry. Furthermore, an expert will discuss the subject.

H. L. Hemmingway has been active for more than twenty years in the technical and sales field of the petroleum industry. His outstanding record includes his current presidency of the National Lubricating Grease Institute. For a number of years he has also been a director of the organization as well as Vice-Chairman of the Technical Committee. One of his most valuable contributions to this industry has been his Chairmanship of a sub-committee which developed and directed the publishing of a lubrication manual known as "Recommended Practices for Lubricating Automotive Front Wheel Bearings." This work resulted in the astonishing sale and use of approximately 100,000 copies. Mr. Hemmingway is active in SAE and served on a panel of experts at a recent meeting. He is also a member of ASLE.

"SYNTHETIC LUBRICANTS AND THEIR PLACE IN THE INDEPENDENT OIL COMPOUNDERS FUTURE"

MR. A. W. ACKERMAN
Director of Research, F. E. Anderson Oil Co., Inc., Portland, Conn.

Jet engines have focused more and more attention on Synthetic Lubricants. They are also being found necessary for other tough lubrication problems.

Mr. Ackerman has done much research on synthetic lubricants for various applications. It has been carried on both as an aid to industry and our armed forces.

He holds B.S. and M.A. degrees from Columbia University. Graduate work was also carried on in chemistry at Columbia and the University of North Carolina.

"GAS TURBINES, NEW CAR DESIGNS, AND THEIR EFFECT ON TOMORROW'S AUTOMOTIVE LUBRICATION MARKET"

MR. HOLGER RIDDER
Automotive Editor, National Petroleum News, A McGraw-Hill Publication

It would be wonderful if one could look in the glass ball and see the future. Next to that will be hearing a discussion of this subject by an unusually well qualified man.

Holger Ridder joined the writing staff of National Petroleum News in 1945. Since then he has become one of the best and widely known writers on lubricants in the petroleum industry. Early in that work he began to specialize in automotive trends and their relations to the marketing of motor oil.

In 1953 Mr. Ridder received a certificate of merit by Industrial Marketing Magazine for his series of articles, "Oil—Your Car and You." In 1954 a first place plaque was awarded him by the same magazine for his story entitled, "How Much Dirt Can Hide in a Crankcase?"

The adaptation of the Gas Turbine to Automotive Engines has been closely followed and will be discussed.

"NEW MOTOR OIL PROPERTIES"

MR. JOHN R. GRIFFIN, JR.
Automotive Technologist, Petroleum Chemicals Division, E. I. Du Pont De Nemours & Co., Wilmington, Del.

"Stop and Go" driving, which is now so prevalent in cities, is slowly wearing out automotive engines. Du Pont has devoted much research to that problem with the resulting development of new additives.

Mr. John R. Griffin, Jr. is a specialist in automotive and aviation fuels and lubricants. At present he is en-

gaged in the introduction of new additives which have been developed by the Chemical Division of his company.

Mr. Griffin received his B.S. and M.S. degrees in Mechanical Engineering from the University of California at Berkeley, Calif. He is a member of SAE, ASME and the Institute of Aeronautical Sciences.

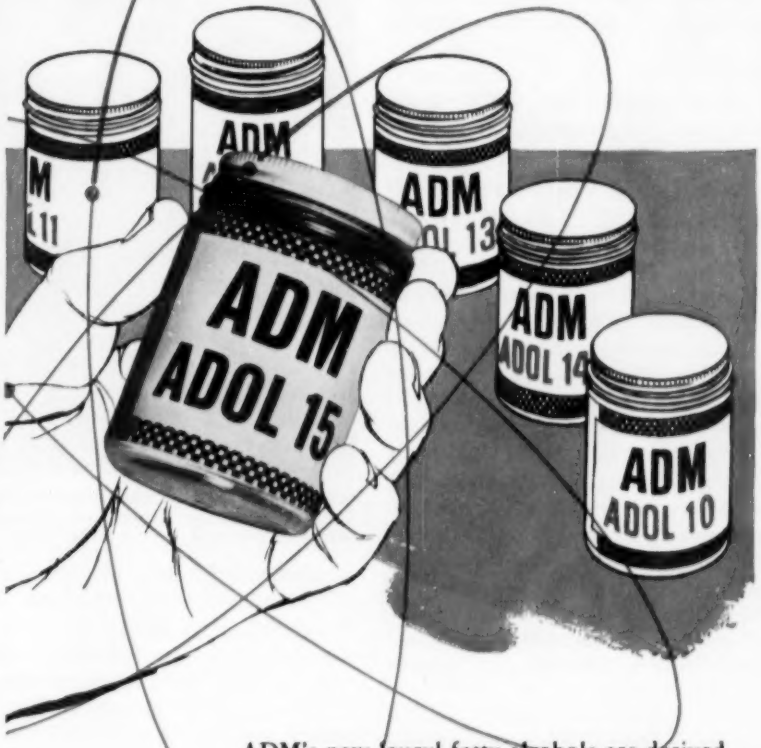
"SELLING HONESTLY—FOR PROFIT"

MR. DALLAS K. RUDRUD
Sales Manager, Hall Chevrolet Company, Milwaukee, Wis.

This is an intriguing subject and of decided interest to all marketers, and especially for Independent Oil Compounders.

Milwaukee has a very active Sales Executive Club. Mr. Rudrud is the president and is rated as a top notch speaker.

NEW
LAURYL ALCOHOLS



ADM's new lauryl fatty alcohols are derived from vegetable oils and fats. ADOLS 10, 11, 12, 13, 14 and 15 are all fractionated to definite composition and are furnished in uniform and consistent specifications and composition as to chain length. These are all water white, noncorrosive, oily liquids possessing a mild fatty odor. They range from 50% to 90% pure C_{12} lauryl alcohol depending on grade.

ADOL lauryl alcohols are among many new saturated and unsaturated fatty alcohols being produced in tank-car and LCL quantities at ADM's ultra-modern Ashtabula, O., plant. Others are: cetyl, stearyl, cetyl-stearyl, arachidyl-behenyl, hydroxy stearyl, stearyl oleyl, oleyl, behenyl, linoleyl, linolenyl, arachidonyl-clupanodonyl, erucyl and ricinoleyl. None of these ADM Chemifats is consumed by ADM; the entire plant output is for sale to industry.

Here is something to work with . . . new fatty alcohols of improved properties, higher purity. Write on your letterhead for samples and advanced technical bulletins.

Hydrofol PRODUCTS

ACIDS
GLYCERIDES
SPERM OILS
ALCOHOLS
from vegetable, animal, marine oils and fats.

Other ADM Products:
Linseed Oil, Soybean Oil, Fish Oil, Paint Vehicles, Vinyl Plasticizers, Foundry Binders, Industrial Cereals, Vegetable Proteins, Wheat Flour, Dehydrated Alfalfa Meal, Livestock and Poultry Feeds.

Archer-Daniels-Midland company
CHEMICAL PRODUCTS DIVISION
2191 WEST 110th STREET • CLEVELAND 2, OHIO

Industry NEWS

Monsanto-Lion Merger

The Boards of Directors of Monsanto Chemical Company and Lion Oil Company today signed an agreement of merger of Lion with and into Monsanto. The agreement will be submitted for approval to stockholders of the two companies at meetings called for September 23.

In a joint announcement, Monsanto's President Charles Allen Thomas and Lion's Board Chairman T. H. Barton of El Dorado, Ark., stated that the basis of merger if approved by the stockholders will be the issuance of 1½ shares of Monsanto $2 par value common stock for each outstanding share of Lion stock.

T. M. Martin, president of Lion, said that more than half of Lion's investment and earnings are chemicals. "We are a large low-cost producer of nitrogenous chemicals—ammonia and its derivatives," Martin said, "which are sold in the chemical and agricultural markets. Monsanto and its associated companies are substantial consumers of ammonia. Monsanto is also a large producer of phosphorus and has developed methods of combining phosphorus with ammonia resulting in concentrated fertilizers in both solid and liquid forms. It is believed that substantial markets for these fertilizers are growing. Monsanto manufactures herbicides and other agricultural chemicals which would complement Lion's activities in this field."

"Lion has a well-balanced and integrated oil producing, refining and distributing organization with a record of achievement and good management," Thomas said. "It's exploration department has been successful in recent years in adding to its oil and gas reserves.

"Other than fuel and power," Thomas said, "more than one-half of Monsanto's raw materials are products which can be or are produced from petroleum fractions or natural gas. It is the belief of both organizations that this union will hasten a long range program of producing an increasing variety of chemical raw materials."

Lion Oil Company has 3,090,915 shares of common stock outstanding,

C. A. Thomas (left), Monsanto President, and T. H. Barton, Lion Board Chairman, seal merger agreement with a handshake.

with sales of $58,694,131 for the first six months of 1955. Monsanto has 15,851,901 shares of the new $2 par common stock outstanding with sales of $207,514,258 for the first six months of 1955. As previously reported, Monsanto's earnings were $16,409,680 or $1.02 per share on the new $2 par stock. Lion's earnings for the first six months were $7,816,987 or $2.53 per share. The combination of the two companies will represent total assets of about $550,000,000.

The identity of the Lion organization will be continued if the merger is approved and it will be known as "Lion Oil Company, a division of Monsanto Chemical Company," headed by T. M. Martin as president of the Lion division. T. M. Martin and T. H. Barton will become members of the Monsanto board.

Thomas also announced that the Monsanto board intends to supplement its regular quarterly cash dividends to supplement its regular quarterly cash dividends of 25 cents a share on the company's common stock with an annual stock dividend of two per cent, provided business activity and the combined companies' profits continue at or near present levels. The first stock dividend would be payable prior to the current year's end, Thomas said.

The merger, if approved by the stockholders of both companies, will become effective on September 30.

Continental Can Presents Scholarship Awards

Three high school graduates have each been awarded a four year, $1,000 annual scholarship from the Carle C. Conway Scholarship Foundation, presented annually to children of Continental Can Company employees. General Lucius D. Clay, chairman of the board, announced that the 1955 competitive scholarship awards were won by James B. Conklin, Jr. of Tampa, Florida; Paul Meyer of Chicago, Illinois; and Michael W. Kuhlmann of Stockton, California.

Winners were selected on the basis of their high school scholastic records and results of college entrance examinations as well as on qualities of character and leadership. Named after the former Continental president and board chairman, the scholarships are given alternately, each year, to daughters and sons of company employees.

At a recent meeting of the Trustees of the Carle C. Conway Foundation, authorization was given for the payment to each college of $300 per year for each award winner attending the college. These payments are to be used for such purpose as the college may determine and will continue so long as the student is eligible for the scholarship.

New Los Angeles Headquarters for Witco's Western Division

Establishment of new headquarters in Los Angeles, California, for the Western Division of Witco Chemical Company was announced today by S. M. Freeman, Vice-President of the division.

The new offices, located at 3460 Wilshire Boulevard, are at a convenient point between the downtown area and Witco's newest plant for production of stearates and driers. The location was chosen to implement both customer convenience when visiting the offices and office-plant traffic and communication, factors vital to efficient order-handling.

Largest Atom Smasher in Industry Purchased by Shell Development Company

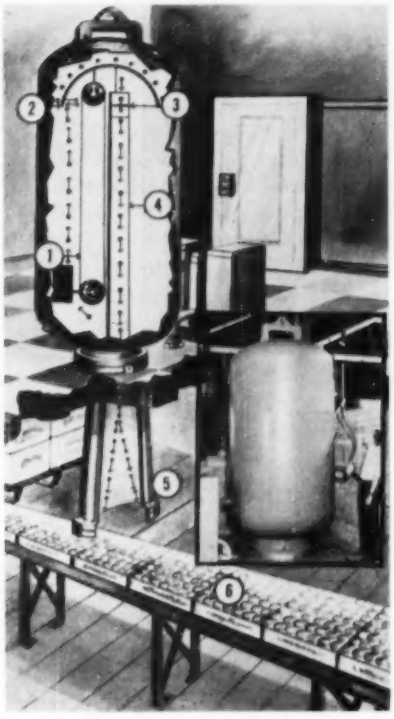


Photo inset shows actual housing for voltage generating column. Diagram explains how it works.

A two-story arrangement will be needed for the three million volt atom smasher—most powerful radiation source available to industry—when it is installed in Shell Development Company's Emeryville, Calif., laboratory in June, 1956, Harold Gershinowitz President announces. The voltage generating column, which produces a high-intensity beam of electrons, will be on the upper floor, and material being exposed to radiation will be passed through the beam on the floor below.

An electric charge sprayed on a fast-moving belt (1) is carried to the top of the column and transferred to a terminal (2), resulting in a great voltage difference between the upper and lower ends of the machine. Charged particles leave the terminal through a heated cathode (3) and hurtle downward along the only possible escape route, the high vacuum tube (4), where they are accelerated to almost the speed of light. A funnel-like attachment (5) directs the particles precisely on to material being irradiated, which is passed through the beam on a conveyor belt (6).

The unit, a Van de Graaff accelerator—sometimes called an "atom smasher" because it was originally used for nuclear research—will be the first of its size in the petroleum industry. It is being built by High Voltage Engineering Corporation, Cambridge, Mass., and will be installed in June, 1956.

Shell scientists will use the accelerator in studying the effects of radiation on fuels, lubricants, plastics and other oil-derived products.

The machine produces a radiation field of extreme intensity, one several hundred times that of the most powerful radioactive cobalt sources now used in industry.

Radiation produced by the accelerator is in the form of a high-intensity beam of electrons traveling at almost the speed of light. This beam is used to bombard a product, causing changes in its physical characteristics. It makes a plastic harder, increases its resistance to solvents and enables it to hold its shape at high temperatures.

With this powerful electron beam, Shell scientists hope to learn more about changes that take place in matter exposed to high energy radiation. Such information could lead to the creation of entirely new products.

The Van de Graaff accelerator, of which Shell will now own two, has two additional advantages over radioactive sources for industrial use: First, when turned off it presents no radiation hazard, whereas a cobalt source is always hazardous; and second, the accelerator is easily adapted to continuous production techniques such as conveyor belt treatment systems.

Shell's other accelerator, a two-million-volt machine, was installed in the company's Houston laboratory in September, 1954. Researchers use this machine in "aging" rocks atomically—by bombarding them with protons. The machine can reproduce in one week the amount of radioactivity to which a rock may have been exposed during ten million years in nature. Such studies can help scientists tell the age of rock formations and thus provide new clues in the search for oil.

The Houston machine is housed in a room with 2½ ft. thick concrete walls, and an electrically operated nine-ton sliding door. A one-ton paraffin "shield" surrounds the target material. When the machine is in operation, no one is in the room. Closed circuit television shows what is going on inside. The most modern safety devices and techniques are used. They are so effective that insurance companies do not classify the work as hazardous.

Deep Rock to Headquarter In Kerr-McGee Bldg.

Executive headquarters of Deep Rock Oil Company will be consolidated in Oklahoma City in the Kerr-McGee building within the next five months, Deep Rock President Frank C. Love announced today.

Since the purchase of Deep Rock's trade name, marketing, refining, and pipeline facilities by Kerr-McGee in a $17,000,000 transaction early this year, a planned integration of certain departments has been pursued. Kermac's own refining, marketing, and research and development operations were the first to consolidate activities within the new Deep Rock Oil Company and these divisions are already functioning in Oklahoma City offices.

Treasury departments and sales control departments are next slated

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for consolidation early in September.

Other Deep Rock marketing divisions, namely direct sales and branded sales together with certain sales support departments are involved in the integration plan.

Deep Rock will continue to maintain its offices in the Atlas Life building, Tulsa, where crude oil purchasing, pipeline operations, district sales office, and others will headquarter.

Complete History of American Oil Industry

A two-volume history of the American oil industry that is expected to be the most complete and authoritative ever published is being written by the Center for Social Research of Northwestern University under a grant provided by the American Petroleum Institute.

The University and the Institute announced jointly today that preliminary work on the project already is under way. Publication is scheduled for 1959, the centennial anniversary of the petroleum industry in the United States.

Chief author and director of the project is Dr. Harold F. Williamson, professor of economics and chairman of Northwestern's committee on business history, under whose auspices the study is being made. Dr. Williamson has published several other industrial histories, and is editor of a collaborative economic history of the United States, "The Growth of the American Economy."

Associate director and co-author is Arnold R. Daum, a historian with 15 years' experience in the oil business.

Arrangements have been made with ranking business and economic historians and leaders in petroleum and related fields for the exchange of manuscripts, bibliographical notes, and other information.

"We think this will be a valuable and unusual history," Dr. Williamson said. "Not only is it the first attempt to survey the entire industry, but it is being carried out under an agreement that incorporates the University's standards of objective research and writing."

Co-Author Daum added: "Our main task is to select from a voluminous literature, and to interpret from this material in relationship to American society and the epic growth of the petroleum industry."

Frank M. Porter, president of the American Petroleum Institute, said:

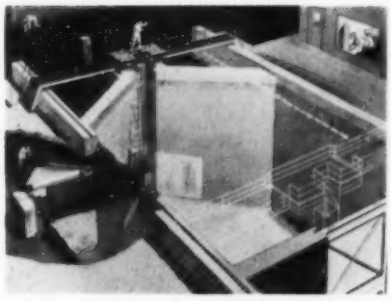
"This will be the first complete history of oil's dynamic growth and development. It will encompass 100 years of civilization, a period of social, human, technological, and economic advancement without precedent.

"Considerable study and discussion preceded not only the decision to sponsor such a history, but also selection of Northwestern University to undertake this task. We feel that Northwestern is eminently qualified to provide the industry and the academic world with an exceptional history, wide in scope and significant in scholarly interpretation."

In addition to the regular staff, there is an academic advisory staff composed of Prof. E. T. Grether, dean of the school of business administration, University of California; Dr. Thomas C. Cochran, professor of American Civilization, University of Pennsylvania, and Prof. G. Heberton Evans, chairman of the department of economics, Johns Hopkins University.

The API History Committee, composed of members of the Board of Directors, is administering the grant on behalf of the industry. It will make periodic reviews of programs, provide technical advice to the authors, and establish channels to sources of information. The Committee includes Stanton K. Smith, president of Smith Oil & Refining Co., Rockford, Ill., chairman; Raymond F. Baker, executive vice president of The Texas Company, New York; Dwight T. Colley, vice president of The Atlantic Refining Co., Philadelphia, Pa.; E. L. Shea, president of Ethyl Corp., New York; D. T. Staples, president of Tide Water Associated Oil Co., San Francisco; Burl S. Watson, president of Cities Service Oil Co., New York; and Dr. Robert E. Wilson, chairman of the board of Standard Oil Company (Indiana), Chicago.

Dr. John W. Frey, of Washington, D. C., retired director of the API Division of Marketing, is assisting the committee in its staff work and maintenance of liaison with the project.



Proposed Nuclear reactor will be owned by eight leading industries including Continental Can Co.

Continental Can Constructs Nuclear Reactor

Continental Can Company has joined seven other companies in the construction and operation of a nuclear reactor which Continental will devote to research on the development of new, improved products and materials in the packaging field.

Production and use of certain isotopes and experimentation in the irradiation of packaging materials and foods will be available to Continental when the reactor is completed in late 1956 or early 1957.

The Industrial Reactor Laboratories, as the facility will be called, will be located on a 250-acre tract either in New Jersey or New York. It will cost between one and one-half million and two million dollars.

The reactor will be constructed by AMF Atomics, Inc., a subsidiary of American Machine and Foundry Company.

Operation of the laboratories will be directed by a leading university, according to a policy set down by the board of directors which is composed of representatives of the various companies.

Emery Completes Twitchell Memorial Laboratories

The unending search for new and improved products and processes in the Fats and Oils field will now be conducted in the new Twitchell Memorial Laboratories recently completed by Emery Industries, Inc., Cincinnati, Ohio.

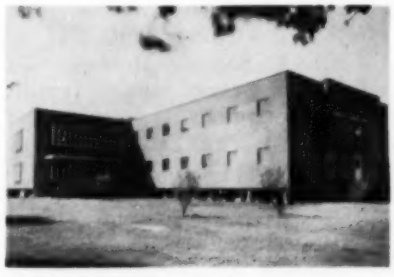
Dedicated to Dr. Ernest Twitchell, Emery's first research chemist, and built at a cost of over $800,000, the new three story, L-shaped building provides 30,000 sq. ft. of floor space for 28 individual laboratories. In it are housed the New Chemical Labs, the Fatty Acid and Esters Labs and the Textile Labs of the Research Department, plus the Chemical Engineering Department and the Development and Service Labs. All are completely air-conditioned.

These facilities and the special application laboratories on the ground floor are well equipped for basic research on products and plant processes and for evaluation of Emery's fatty acids, plasticizers and textile oils in such practical applications as plastics, rubber, textiles, soaps and detergents, cosmetics, molded products, paints, lube oil and greases and metal-working oils.

There is also a special laboratory and a small scale dry cleaning plant for study of Emery's latest developments in connection with its nationally advertised Sanitone Service which is licensed to selected dry cleaners throughout the world.

The new research center also includes an up-to-date library with all available literature on the developments and findings in the fast moving fields of chemistry and engineering, and is equipped with all modern visual aid devices. Executive offices and a conference room are also in this section of the building.

The ribbon-cutting ceremonies (June 13) which officially opened the Twitchell Memorial Laboratories



Twitchell Memorial Laboratories

were conducted by John J. Emery, president, assisted by the mayor of Cincinnati and other local civic leaders. Emery's board of directors and division heads were also in attendance. A "family preview" held a day prior to the opening ceremonies was attended by over 600 Emery employees.

Committee D-2 on Petroleum Products and Lubricants

Committee D-2 again had the distinction of submitting to ASTM at their annual convention the largest report totaling 101 pages. As another indication of the extent of the activities of this committee there were 95 meetings of D-2 divisions and subcommittees held over a period of 6 days.

Of particular significance was the completion of extensions to Tables 6 and 7 and a new abridged table for liquified petroleum gases to be added to the ASTM-IP Petroleum Measurement Tables (ASTM D 1250; IP 200). The extensions of Tables 6 and 7 provide values for a temperature range from 0 to —50 F for volume corrections with entry in API gravity. These additional tables are now being reviewed and checked by the Institute of Petroleum (London).

Twelve proposed methods of test were submitted for publication as information only for trial use during the coming year. These covered such subjects as emulsion stability of cutting oils, galvanic corrosion of instrument oils, blocking point and oxidation stability of waxes, estimation of heat of combustion of petroleum, tetraethyl lead in gasoline by polarograph, consistency and deletereous substances in greases, tests for benzene and individual xylenes by infrared spectrophotometry, and water in bituminous materials.

The new proposed test for measuring color of petroleum products provides a set of glass color standards that are expressed in fundamental terms and are of proper chromaticity. This new ASTM Color Scale differs slightly from the Union Scale in that the difference in chromaticity (spacing) between the successive glasses is uniform throughout the scale.

In view of the committees intention to participate in the West Coast National Meeting of the Society to be held in Los Angeles in 1956, plans are under consideration for three symposia to be sponsored by the committee: a Symposium on Vapor Phase Oxidation of Gasoline, a Symposium on Grades and Uses of Lubricating Oils, and a Symposium on Turbine Oils.

At the Annual Dinner of Committee D-2, the guest of honor was Oscar Lewis Maag, who served as chairman of the committee for three terms from 1949 to 1955. In addition to directing the activities of the committee, Mr.

Maag was also active in a number of research divisions and subcommittees, and was chairman of Technical Committee K on Cutting Fluids from 1946 to 1952, also taking an active part in Technical Committee G on Lubricating Grease. Mr. Maag has retired from his company and has resigned as chairman of the committee. H. M. Smith has been appointed to serve the balance of Mr. Maag's unexpired term.

Monsanto Brand Name for Agricultural Chemicals

Monsanto Chemical Company today announced that its Organic Chemicals Division will market agricultural chemical formulations under the Monsanto label in a 15-state midwestern area beginning in 1956.

The company is starting immediately to set up the necessary wholesale and retail distribution to the area for its new line of brand-name chemicals. To date, 18 products have been named to the line which includes weed-killer formulations, brush-killers, insecticides and crop desiccants. (Crop desiccants assist mechanical harvesting of certain crops.)

The initial sales region for Monsanto's farm chemicals includes: Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Montana, Nebraska, North Dakota, South Dakota, Ohio and Wisconsin. Four sales districts have been established to service the area with district headquarters to be located at Minneapolis, Minn., Des Moines, Iowa, Kansas City, Mo., and Indianapolis, Ind.

Although a new name among farm chemical brands, Monsanto is one of the nation's largest producers of technical grade agricultural chemicals. Over the past 10 years, it has been a major manufacturer of pesticides such as DDT and parathion for insects and 2, 4-D and 2, 4, 5-T for weeds and brush. Applications of these chemicals have become standard control methods in modern farming.

Until now, Monsanto has restricted its agricultural chemical efforts to the sale of active ingredients to formulators who, in turn, processed and packaged these materials for the farmer under a variety of brand names. This will be the first time that herbicides and insecticides for farm use will carry the Monsanto label, although a sodium meta-bisulfite silage preservative trade-marked Medo-Green has been marketed to farmers by another Monsanto division since 1953.

Charles H. Sommer, Monsanto vice president and general manager of its Organic Chemicals Division, views the company's sale of brand-name chemicals through retail channels to the farmer as beneficial to the farmer and constructive to the farm chemical business. Sommer is a director of the National Agricultural Chemicals Association.

"By bringing our company into a direct relation with the farmer through these products," Sommer said, "we obtain a quicker and surer grasp of farm problems that may be solved chemically. This will permit us to aim our product research and development efforts more accurately at those problems, and to give farmers quicker access to new products born of those efforts."

Agricultural chemicals research is one of the two or three largest research projects being carried on by Monsanto, according to Sommer, with a 1955 budget six times the amount spent by the company on such work in 1951. He said the company's Creve Coeur, Mo., laboratories yearly screen at least 2,000 likely chemicals for pesticidal activity alone.

Three new pre-emergence herbicides recently announced by Monsanto have shown good results against grass pests in numerous tests on corn and other crops, Sommer said. He added that one or more of these new products may be available to farmers for the 1956 season.

Monsanto's marketing plan for its brand-name farm chemicals includes aggressive advertising of its line to farmers in the 15-state sales area, Sommer said, and an extensive use of educational methods such as demonstration teams to help the farmer learn to profit more from farming with chemicals.

New Standards for Retreading Tires Announced By National Association

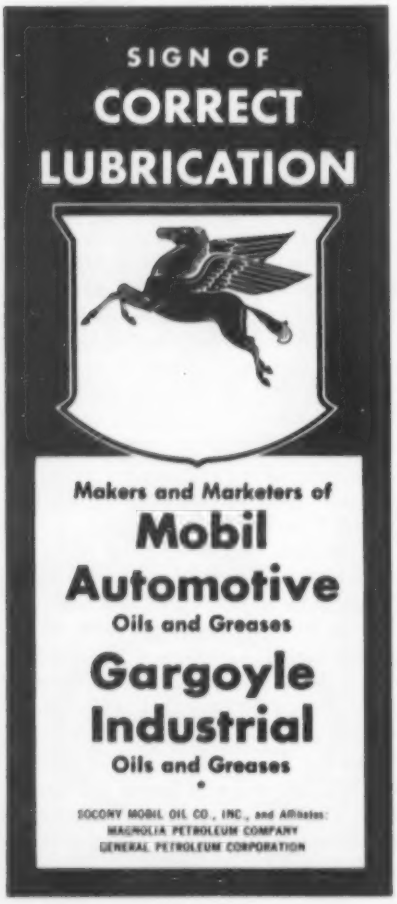
The foundation for a nationwide continuing expansion of the use of retreading to extend tire life has been laid with the adoption of industry-wide standards and specifications for the retreading of automobile and truck tires.

Bill Deane, President of the National Association of Independent Tire Dealers, announced here today that the standards and specifications developed through the Association were the result of two years of conjunctive effort by the tire manufacturers and the makers of retreading materials and equipment.

"The adoption of these standards by all segments of the industry and their use by the nation's thousands of tire dealers," said Mr. Deane, "will provide real protection for the motorist and provides retreading with new prestige and recognition."

"The nationwide use of these standards and specifications will mean that the average motorist can take advantage of the economies of retreading with the same confidence as the fleet truck operators who have used retreads for years," Mr. Deane said.

Following conferences with the principal rubber manufacturers, Mr. Deane said the existence of nationally



recognized standards "would go a long way toward continued advancement of the retreading industry."

He said the agreement on these standards reached among tire manufacturers, the dealers' association, and the manufacturers of camelback and retreading equipment would provide a basis for better understanding between producers and users and protect purchasers against inferior materials and workmanship.

The new national standards provide for the first time a uniform definition of the terms used in retreading, making clear the meaning of "Full-Treading," "Top-Treading," "Undertread," "Skid-Depth," and specifying the composition of the synthetic rubber and cold rubber.

Requirements of the new code govern the quality of the camelback used, the dimension tolerances, the padding stock, the cement, solvent, age limits of the camelback, and the inspection and preparation of the tire.

The standards cover the types of camelback used and the methods of application of each, including the curing. Tires must be inspected after curing to assure minimum tread thickness, with a minimum skid depth on passenger tires of 10/32 inch. On truck tires, the skid depth shall be equal to that of a new 100 level tire of the same type and size with a tolerance of 2/32 inch.

Witco Appoints West Coast Technical Representative

Announcement was made recently, by Stanley Freeman, Vice-President of West Coast Operations of the Witco Chemical Company, of the appointment of William Blalock as Technical Representative for Stearates. Mr. Blalock, who will operate only in Witco's West Coast region, will have responsibilities involving plant operation, stearate research and technical sales.

A resident of Whittier, California, Mr. Blalock joins Witco after 10 years' experience in the field of metallic stearates. Graduated from the University of Indiana, he received his MS degree in Chemistry from the University of Southern California. Subsequently, he has served as a Chemistry teacher in Petaluma High School, Petaluma, California, in the military service, and with the Leffingwell Chemical Company.

1955 Approved Lubrication For Tractors

With the printing of the 1955 seventh edition Approved Lubrication for Tractors, The Chek-Chart Corporation's lubrication information coverage of the farm tractor field is the most complete ever published. The chart format, embodying scale drawings, is combined with a clearly written text to show the exact location of each lubrication point, with detailed instructions as to when and how to lubricate. For oil company personnel calling on farm accounts, as well as for farmers servicing their own tractors, the 7th Edition is an indispensable aid to thorough, manufacturer-approved lubrication.

There are a total of 79 chart pages, giving the very latest lubrication rec-

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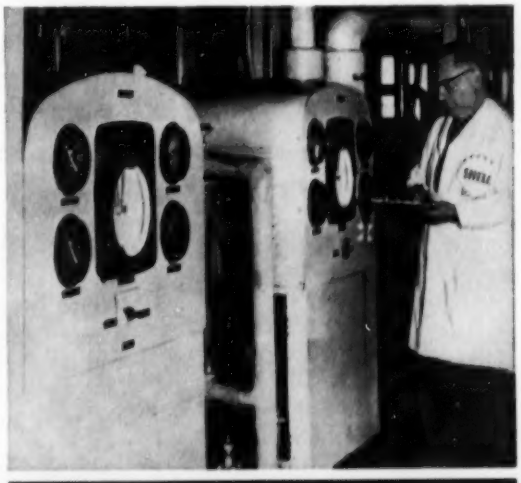

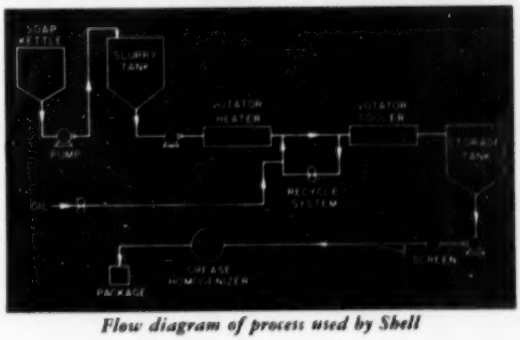

Flow diagram of process used by Shell

ommendations for all popular farm tractors—both wheel-type and track-laying type—produced during the last 15 years. Add to these, six pages of Service Instructions, a special "Know Your Tractor Chart," tire care and tractor storage suggestions, and a picture is drawn of the best on-the-job manual and reference.

Individual tractor charts, suitable for distribution to farmers, are available on a quantity basis. For further information, including prices, both single copies and quantity orders, contact The Chek-Chart Corporation, 33 East Congress Parkway, Chicago 5, Illinois.

Three New Drum Specifications Announced

Three recommended universal standards for steel container specifications have been announced by the Steel Shipping Container Institute, whose members produced over 53-million new steel containers in the first half of 1955.

The new specifications are for 55-gallon drums conforming to Interstate Commerce Commission regulations 5B, 17C and 17H, which cover the shipment of regulatory, or dangerous, products. ICC-5B and ICC-17C cover tight-head drums for the shipment of liquid products; ICC-17H covers a fully-removeable-head drum for the shipment of solid or semi-solid products.

The new specifications are the first additions to recommended universal standards published by the SSCI in October, 1954. They have been approved by the Metal Packages Committee of the Manufacturing Chemists' Association, the Petroleum Packaging Committee of the Packaging Institute and the Bureau of Explosives, Association of American Railroads. They are also being published as Federal Specification PPP-D-729, Amendment 1.

With the consumption of 100-million new containers annually, the importance of recommended universal standard specifications, for economies in production, handling and shipping, is very great. The SSCI has been working with associations representing major container consuming industries to establish recommended universal standards for those containers used in large quantities. To date, a total of ten steel containers are covered by the standards approved by interested groups.

Detailed specifications, now being distributed to members of the SSCI and other associations, are generally available to container users upon request to the Steel Shipping Container Institute, 600 Fifth Avenue, New York 20, N. Y.

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Witco Increases Carbon Black Production

Construction of major production facilities increasing by 10 per cent the total annual national output of SRF type of carbon black and meeting growing demand, particularly for automotive rubber products, was announced today by Max A. Minnig, Executive Vice-President of Witco Chemical Co.

Mr. Minnig said that new facilities to be located at the Witco-Continental plant at Eunice, New Mexico, will produce 25,000,000 pounds of SRF (semi-reinforcing, furnace) carbon black specifically to meet automotive requirements. Annual capacity of the Witco-Continental plant at Sunray, Texas, he added, already has been expanded by 6,000,000 pounds of FEF (fast extrusion, furnace) carbon black used in the manufacture of garden hose, wire coatings, flexible tubing and other extruded rubber products.

"Passenger and truck tire production last year amounted almost to 90,000,000 units," Mr. Minnig explained. "In the first six months of this year, the rubber industry produced about 57,700,000 units. Additionally, the increased output of new cars has created need for larger quantities of rubber mechanical goods such as windshield gaskets, mats, grommets and bushings. Since SRF carbon black goes into the formulation of all these products, the demand is noticeably higher. Our expanded output will enable us satisfactorily to meet the growing requirements of our customers in the rubber industry."

SRF carbon black, one of the first furnace blacks, has been manufactured by the Witco-Continental group at Sunray, but factors such as the availability of plentiful supplies of natural gas dictated that the new construction be undertaken at Eunice, site of one of Witco-Continental's several channel black plants. The new construction will give Eunice, and the state of New Mexico as well, its first gas furnace carbon black plant. Orders for equipment already have been placed, and it is expected that the new plant will be on stream in the first quarter of 1956.

The installation will be directed by Witco-affiliated Continental Carbon Co., operator of the present Eunice plant. Sale of all Continental black production is handled by Witco Chemical Co.

API Offers Advertisements

Another handsome selection of advertisements which may be used by service stations, fuel oil dealers, and other local oil companies during Oil Progress Week next Fall has been prepared by the American Petroleum Institute.

Proofbooks of the many attractively designed advertisements are being distributed to daily and weekly newspapers throughout the country. Mats of any or all of the advertisements may be obtained by publications gratis. An order blank is incorporated in the 1955 proofbook.

Newspapers and other publications

are being urged by the Institute to make their mat requests early to avoid last-minute delays and pile-ups.

Oil Progress Week will be observed October 9-15 this year, and the current selection of advertisements is in keeping with the Institute's program of supplying the nation's press with as much basic material as possible. Last year, more than 9,000 tie-in advertisements were used by 12,000 sponsors for a total of 339,000 column inches.

The advertisements range from one to eight columns in size. They are ready for use, as is, simply by inserting the sponsoring company's name and address. The selection is wide in content, with advertisements ready and waiting for service stations, fuel oil dealers, liquefied petroleum gas distributors, and for general use. Virtually all phases of petroleum are covered in one or more of the advertisements.

Supplemental materials include three pages of feature articles and illustrations. Line drawing and halftones are available gratis as glossy photographs or 65-screen mats.

Motorist Learns Value Of Lube Safety Check

Continued from page 9

you'll be interested in this. Since Mr. Forbes had the experience of nearly losing his life he has always carried a credit card issued by the company whose serviceman warned him. He has never from that day to this had anyone touch his car except servicemen in stations maintained by that company.

Do you have a true story about a motorist who is indebted to a serviceman as the result of a lube and safety check? Send it in to us.

Swift & Company Offers 12-Hydroxy Stearic Acid

12-Hydroxy Stearic Acid—a new product designed primarily for use in lubricating greases—is now in production by Swift & Company's Industrial Oil Department, it was announced.

The new product is designed for use in lithium multi-purpose greases—where consistency and stability are required over a large range of temperature and moisture conditions.

Swift & Company reports the following specifications for 12-Hydroxy Stearic Acid:

Titer (°C)	72-75
Hydroxyl Value	154 min.
Iodine Value (Wijs)	1-5
Acid Number	174-183
Saponification No.	185-192

For further details, write Swift & Company, Industrial Oil Department, 1800 165th Street, Hammond, Indiana.

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J&L STEEL

FUTURE MEETINGS of the Industry

SEPTEMBER, 1955

8-9 American Petroleum Institute (OIIC meeting), Conrad Hilton Hotel, Chicago, Ill.

12-15 Society of Automotive Engineers (tractor meeting), Hotel Schroeder, Milwaukee, Wis.

13-15 National Petroleum Association, Atlantic City, N. J.

14-16 National Petroleum Association (53rd annual meeting), Traymore Hotel, Atlantic City, N. J.

22-23 Mid-Continent Oil & Gas Assn. (La.-Ark. Division annual membership meeting), Roosevelt Hotel, New Orleans, La.

26-27 Independent Oil Compounders Assn. (annual meeting), Hotel Bismarck, Chicago, Ill.

25-28 American Institute of Chemical Engineers, Lake Placid Club, Lake Placid, N. Y.

27-28 Ohio Petroleum Marketers Association Fall Conference and Golf Tournament, Netherland Plaza Hotel and Maketewah Country Club, Cincinnati, Ohio

OCTOBER, 1955

2-5 AIME Petroleum Branch (Fall meeting), Roosevelt Hotel, New Orleans, La.

2-6 ASTM Committee D-2, Petroleum Products and Lubricants, Statler Hotel, Washington, D. C.

3-7 American Institute of Electrical Engineers (Fall general meeting), Morrison Hotel, Chicago, Ill.

9-15 American Petroleum Institute Oil Progress Week

11-15 Society of Automotive Engineers, Hotel Statler, Los Angeles, Calif.

12-13 South Dakota Independent Oil Men's Assn., Mitchell, S. D.

18-22 National Safety Council (43rd National Safety Congress and Exposition), Chicago, Ill.

24-26 American Standards Assn. (annual meeting), Sheraton Park Hotel, Washington, D. C.

27-29 Rocky Mountain Oil & Gas Assn. (annual convention), Cosmopolitan Hotel, Denver, Colo.

23-25 National Association of Oil Equipment Jobbers (5th Annual Meeting), Hotel President, Kansas City, Mo.

31 to Nov. 1 Independent Petroleum Assn. of America (annual membership meeting), Jefferson Hotel, St. Louis, Mo.

31 to Nov. 2 NLGI ANNUAL MEETING, EDGEWATER BEACH HOTEL, CHICAGO, ILL.

31 to Nov. 2 Society of Automotive Engineers (transportation meeting), Chase Hotel, St. Louis, Mo.

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"WELL, WOT D'YA KNOW, HOYST! TH' KIDS FOUND A USE FOR TH' RACK!"

NOVEMBER, 1955

2-4 Society of Automotive Engineers (diesel engine meeting), Chase Hotel, St. Louis, Mo.

9-10 Society of Automotive Engineers (fuels and lubricants meeting), Bellevue-Stratford Hotel, Philadelphia, Pa.

13-18 American Society of Mechanical Engineers (75th anniversary meeting), Hilton & Blackstone Hotels, Chicago, Ill.

14-17 American Petroleum Institute (35th annual meeting), Mark Hopkins, Fairmont, St. Francis, and Palace Hotels, San Francisco, Calif.

16 American Petroleum Institute (OIIC Steering Committee meeting), San Francisco, Calif.

17 National Industrial Conference Board (general session), Bellevue-Stratford Hotel, Philadelphia, Pa.

27-30 American Institute of Chemical Engineers (annual meeting), Statler Hotel, Detroit, Mich.

DECEMBER, 1955

6-7 Petroleum Packaging Committee of Packaging Institute, Benjamin Franklin Hotel, Philadelphia, Pa.

8-9 American Petroleum Institute (OIIC meeting), Waldorf-Astoria Hotel, New York, N. Y.

11-14 American Society of Agricultural Engineers (Winter meeting), Edgewater Beach Hotel, Chicago, Ill.

JANUARY, 1956

9-13 SAE Annual Meeting, Sheraton-Cadillac Hotel and Hotel Statler, Detroit, Mich.

APRIL, 1956

18-20 National Petroleum Association, Cleveland, Ohio

JUNE, 1956

3-8 SAE Summer meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

SEPTEMBER, 1956

12-14 National Petroleum Association, Atlantic City, N. J.

NOVEMBER, 1956

1-2 SAE National Diesel Engine Meeting, Drake Hotel, Chicago, Ill.

8-9 SAE National Fuels and Lubricants Meeting, The Mayo, Tulsa, Okla.

APRIL, 1957

16-18 National Petroleum Association, Cleveland, Ohio

SEPTEMBER, 1957

11-13 National Petroleum Association, Atlantic City, N. J.

APRIL, 1958

16-18 National Petroleum Association, Cleveland, Ohio

SEPTEMBER, 1958

10-12 National Petroleum Association, Atlantic City, N. J.

NLGI ANNUAL MEETING

Make Your Room Reservation

SEND IT TO:

Reservation Department, Edgewater Beach Hotel

5300 Block—Sheridan Road, Chicago, Illinois

Meeting Dates Are . . . Oct. 31 and Nov. 1, 2, 1955

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